ORIGINAL INSTRUCTIONS

Safety manual
(Use and maintenance)

Goal series machines
GKS/0-GKD

LINUX-XQ electronic equipment

ISO 9001: 2008 e BS OHSAS 18001: 2007

Version 001

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ATTENTION

KEEP THIS MANUAL AND PASS IT ON TO ANY NEW OWNERS

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Index

1 SAFETY RULES AND CORRECT USE OF THE MACHINE

1.1. GENERAL RULES FOR THE SAFETY AND PROPER USE OF THE MACHINE

Before using the machine, all the operators and higher-ranking personnel are required to thoroughly read and learn the instructions contained in the manual.

The failure of any member of staff in complying with said instructions could compromise personal/collective safety and/or damage the machine, for which LONATI shall be held harmless from any civil or criminal liability whatsoever. The employer must provide appropriate training and information for employees in accordance with existing legislation in the country of use and the qualifications of the personnel employed.

Note: On the user's specific request, machine operators can also be trained at LONATI's premises, provided that the trainees are properly acquainted with the technological characteristics of the knitting process and the yarns used on the machine.

The machine must never be operated in the following cases:

1) The operator has not read and understood the operating principles contained in this manual.
2) There are any doubts on the perfect safety conditions of the machine.
3) The operator does not feel confident in his/her ability to run or service the machine under appropriate safe conditions.
4) All the machine safety guards and devices are not installed or do not function properly.
5) In case of doubt or need for further information on the use of the machine under proper safety conditions, reference should be made to the safety manager only.

For anything you may require regarding the machine, please contact the LONATI Technical Service at the following address:

ADDRESS and CONTACTS	
MAIL ADDRESS:	Lonati S.P.A., 3 Via Francesco Lonati, 25124 Brescia, Italy
WEBSITE:	http://www.lonati.com
TELEPHONE:	0039 030 23901
FAX:	0039 030 2310024

LONATI disclaims all liability for risks associated with personnel safety at all levels and/or damage to or malfunctions of the machine caused by incorrect application of the provisions contained in this manual or by problems in reading it due to the fact that it has deteriorated or has become incomplete due to reasons attributable to members of staff or any third parties.

IMPORTANT! Each operator must keep a copy of this manual in a perfect legible condition and store it readily available in case of need.

LONATI reserves the right to make changes to the machine and manuals at any time without prior notice.

1.2. MANUALS ACCOMPANYING THE MACHINE

The documentation accompanying the machine is supplied in multi-media format, on a CD or DVD, and comprises:

- The Safety Use and Maintenance Manual
- The Mechanical Adjustment Manual
- The User Interface Manual
- Electronic diagrams and wiring layout
- Software update instructions
- Layout of flat parts for needle-by-needle selection machines
- Spare parts catalogue

Note: If you bought a machine model and for any reasons it was not accompanied by the relevant kit, please log on to our website to freely download complete documentation.

Or contact our Lonati Technical Customer Service.

1.3. USER AND MAINTENANCE MANUALS DOWNLOADABLE FROM LONATI'S WEBSITE

When you access our website http://www.lonati.com from the navigation bar, click on "Support" and fill in the registration form to freely view and download the technical documention required for the operation of your machine models.

In the navigation bar, click on "E-commerce" and fill in the registration form to access and view the spare parts catalogues or download any updates of the latest models in real time; you can can also send orders on line.

1.4. RESIDUAL RISKS FOR THE SAFETY OF OPERATORS AND ALL PERSONNEL WITH HIGH-LEVEL TASKS AND SKILLS.

The machine is designed and built with the aim of eliminating any risks of injury at source, however there are some residual risks the origin of which has been protected with appropriate guards and/or safety devices.

If a safety guard or device is considered insufficient to ensure full protection, the residual risk is highlighted in the “Table of residual risks for the safety of operators and personnel with high-level tasks and skills” shown below.

The table above lists the hazards (possible source of injury, according to the reference standard), the areas of the machine involved and the relevant operational steps (localisation of parts where there is a residual risk and any possible associated interventions), the possible scenario and the extent of the residual risks based on the measures taken.

TABLE OF RESIDUAL RISKS FOR THE SAFETY OF OPERATORS AND PERSONNEL WITH HIGH-LEVEL TASKS AND SKILLS			
HAZARD	**AREAS OF MACHINE AND OPERATIONAL STEPS**	**POSSIBLE SCENARIO**	**EXTENT OF RESIDUAL RISK**
CRUSHING	Between the lower part of the base and the floor	Machine placement and levelling and/or when making adjustments	Slight residual risk, complying with the following precaution: do not place your hands or other parts of your body under the base when the machine is being partially or fully raised off the ground.
	Between the yarn finger plate and the cutter unit of the edge horizontal line	Maintenance	Slight residual risk, complying with the following precaution: do not place your hands or other parts of your body between moving rigid component parts.
	Among the various components of the reel stand during its installation	Installation or maintenance operations	Slight residual risk, complying with the following precaution: do not place your hands or other parts of your body between two or more rigid component parts at any stages of installation.
SHEARING	Between the machine base and electrical cabinet, when it is being closed	Checks & inspections – maintenance operations– accidental contact	Slight residual risk using suitable safety gloves, only with the machine stopped

TABLE OF RESIDUAL RISKS FOR THE SAFETY OF OPERATORS AND PERSONNEL WITH HIGH-LEVEL TASKS AND SKILLS			
HAZARD	**AREAS OF MACHINE AND OPERATIONAL STEPS**	**POSSIBLE SCENARIO**	**EXTENT OF RESIDUAL RISK**
CUTTING OR SHREDDING	Sharp edges of all textile accessories (sliders, jacks, needles, sinkers) and cylinder and sinker crown slits	Checks & inspections – maintenance operations– accidental contact	Slight residual risk using a trapper specific for textile accessories and suitable safety gloves, only with the machine at a standstill
	The serrated profile of the thread trimmer disc, thread knife sharp edges, dial jack edges and dial notches, with the dial either raised or lowered	Maintenance operations	Slight residual risk using a trapper specific for textile accessories and suitable safety gloves, only with the machine at a standstill
	The edges of various component parts at the top of the reel stand	Checks & inspections – maintenance operations – installation of yarn bobbins on the reel stand - accidental contact	Slight residual risk using an appropriate hard hat when installing the yarn bobbins on the reel stand
ENTANGLEMENT	Sharp edges of all textile accessories (sliders, jacks, needles, sinkers) and cylinder and sinker crown slits	Checks & inspections – maintenance operations	Slight residual risk using a trapper specific for textile accessories and suitable safety gloves, only with the machine at a standstill
PUNCHING OR PIERCING	Pointed parts of cylinder needles, sinkers and needle-opener tips;	Checks & inspections – maintenance operations– accidental contact	Slight residual risk using a trapper specific for textile accessories and suitable safety gloves, only with the machine at a standstill
PROJECTION OF MACHINE PARTS	Residues resulting from the breakage of textile accessories (sliders, jacks, needles, sinkers, dial jacks) or other component parts during the rotation of cylinder and dial	Checks & inspections – maintenance operations– accidental contact	Slight residual risk with safety guards installed

TABLE OF RESIDUAL RISKS FOR THE SAFETY OF OPERATORS AND PERSONNEL WITH HIGH-LEVEL TASKS AND SKILLS			
HAZARD	**AREAS OF MACHINE AND OPERATIONAL STEPS**	**POSSIBLE SCENARIO**	**EXTENT OF RESIDUAL RISK**
SLIPPING – TRIPPING – FALLING	Oil leak from the lubrication pump, located at the bottom rear of the machine	Access to the operating area of the machine	Slight residual risk provided that the lubrication pump is properly maintained Slight residual risk provided the normative schedule for periodical cleaning of the workplace is complied with
	Oil leak from the joints of the mobile guard supports	Access to the operating area of the machine	Slight residual risk depending on the presence of suitable sealed washers for fixing the support to the mobile guards Slight residual risk provided the normative schedule for periodical cleaning of the workplace is complied with
	Oil mist accumulated on the floor	Access to the operating area of the machine	Slight residual risk using appropriate footwear with an anti-slip sole Slight residual risk provided the normative schedule for periodical cleaning of the workplace is complied with
CONTACT WITH OIL OR INHALATION	Cylinder, sinker crowns and dial in rotation	Presence of oil mist in the air due to automatic lubrication of the machine	Slight residual risk with the machine equipped with the appropriate mobile guards Slight residual risk with the installation of an adequate suction plant if the concentration of oil mist in the workplace is excessive according to the laws in force in the country where the machine is installed.

TABLE OF RESIDUAL RISKS FOR THE SAFETY OF OPERATORS AND PERSONNEL WITH HIGH-LEVEL TASKS AND SKILLS			
HAZARD	**AREAS OF MACHINE AND OPERATIONAL STEPS**	**POSSIBLE SCENARIO**	**EXTENT OF RESIDUAL RISK**
FIRE	Yarn fed by the reels Finished socks and any waste materials expelled from the machine	Inspections conducted while holding lit cigarettes, cigars and matches or a naked flame Installation of the yarn reels on the stand with lit cigarettes, cigars and matches or a naked flame Accidental contacts with lit cigarettes, cigars and matches or a naked flame	Slight residual risk by affixing clearly visible panels, showing specific signs and warnings regarding the ban on smoking or using naked flame within the machine operating range
BURNS AND SCALDINGS	Main motor Electro-extractor motor All machine stepper motors and attached devices	Inspections & checks – accidental contact	Slight residual risk using suitable safety gloves, only with the machine stopped Slight residual risk provided the following warning is complied with: “It is strictly prohibited to access the machine operating area and perform any operations with any of the motors running”
FAILURE TO WEAR PERSONAL PROTECTIVE EQUIPMENT	Machine operating range	Machine running – Machine at a standstill	Slight residual risk provided the following precaution is complied with: “Always use appropriate personal protection equipment when performing special operations on the machine and anything attached to it”

1.5. ANALYSIS OF THE IMPOSSIBILITY OF ELIMINATING RESIDUAL RISKS AT THE DESIGN STAGE

The machine was designed and built with the aim of minimising any possible risks for both operators and personnel entrusted with high-level tasks and skills.

There are, however, parts of the machine which, for process reasons and specific function, can be neither designed nor built otherwise, such as:

- The unit known as “head”, which is the core of the machine as it contributes to sock formation. The top part of it is not protected and it is absolutely forbidden to bypass the side protection guards from above.
- The cutter is part of the horizontal transmission unit and is placed over the cylinder head. It has a very sharp serrated profile and great care must be taken to avoid getting in touch with it, as shown in the “Table of residual risks for the safety of all operators and personnel with high-level tasks and skills”, which lists the hazards and possible causes of injury, depending on the reference standard.
- All machine flat parts and textile accessories, such as sliders, jacks, needles, sinkers and dial jacks, which have numerous pointed and sharp edged areas, require special care in preventing any impact and any operations without the aid of a special grippers, as shown in the “Table of residual risks for the safety of machine operators and personnel with higher duties and qualifications”, containing a list of hazards and possible causes of injury, according to reference standards.
- All parts of the machine on which notice plates containing recommendations on how to run the machine safely and properly have been affixed to specific zones of the machine.

1.6. ADHESIVE LABELS STUCK ONTO THE MACHINE SHOWING HAZARD/WARNING/ PROHIBITION AND MANDATORY INSTRUCTION SIGNS

All risk-associated parts are identified with the following hazard/warning/prohibition and mandatory instruction signs, which when worn must be replaced with new legible ones.

Danger of moving parts "Reference A"

Crush hazard "Reference B"

Danger high voltage "Reference C"

Prohibition/hazard/mandatory instruction label "Reference D"

Figure No.1.6.a

Danger of moving parts
"Reference A"

Crush hazard
"Reference B"

Danger high voltage
"Reference C"

Prohibition/hazard/mandatory instruction label
"Reference D"

Sample positioning of labels for hazardous parts
References A-B-C-D indicate the type of label applied

1.7. "GREEN CERTIFIED" LABEL AWARDED

Lonati S.p.A has started a process aimed at improving the environmental impact of its products for some time now, as it is convinced that reducing pollution at a global level is one of the priorities to create a better future.

Lonati S.p.A participates in the "SUSTAINABLE TECHNOLOGIES" project launched by ACIMIT (the Association of Italian Textile Machinery Manufacturers) to provide technological solutions focusing on a reduction of the use of energy sources required to operate the machine.

Figure No.1.7.a

View of the position of the "Green certified" label

1.8. MACHINE MARKING DATA AND DECLARATION OF CONFORMITY

The identification data of each machine are entered in the DECLARATION OF CONFORMITY attached to the machine documents, an example of said declaration is given here below.

DECLARATION OF CONFORMITY *-CE-*

We, the undersigned

LONATI S.p.A.
Via Francesco Lonati 3
25124 BRESCIA

hereby declare under our sole responsibility, in our capacity as manufacturers, that:

the PRODUCT: 1 LONATI ma-" electropneumatic single-cylinder"
chine
MODEL: ***GK***

SERIAL NUMBER:

to which this declaration refers, complies with Directives

2006/42/CE,2014/30/UE, 2014/35/UE

ISO 9001:2008 and BS OHSAS 18001:2007 standards

with standards:

EN ISO 12100:2010
EN ISO 11111-1:2010
EN ISO 11111-6:2010
EN 60204-1:2006

EC regulation no. 640/2009

CERTIFIED ISO 9001

CERTIFIED BS OHSAS 18001

The last two digits of CE marking year: ....

The person authorised to prepare the technical file is Cesare Polimeni

Address: 3 Via Francesco Lonati, Brescia, Italy

LONATI S.p.A.
Sede Leg. e Amm.va:
Via Francesco Lonati, 3
25124 BRESCIA

Brescia, --/--/--

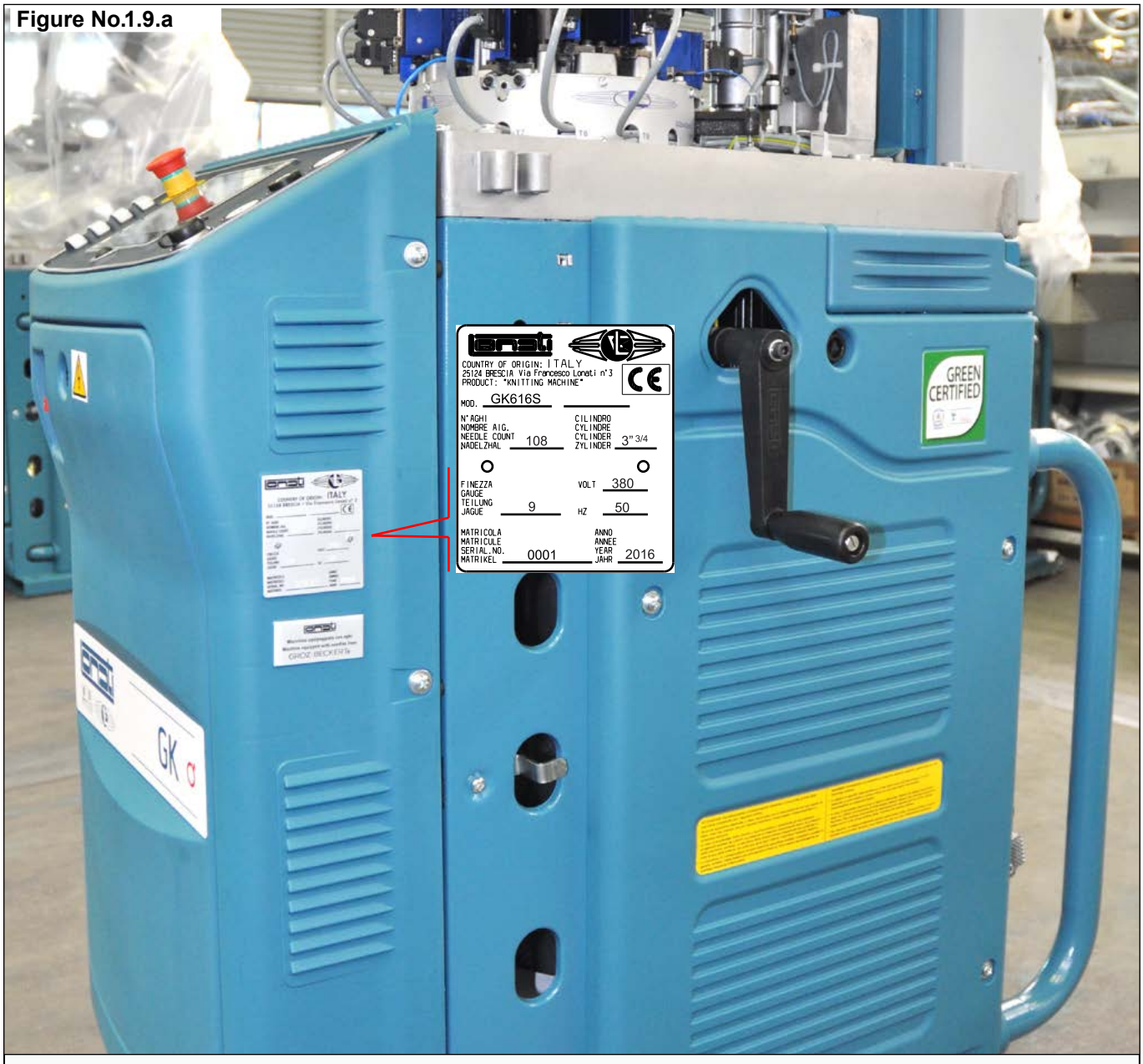
(luogo e data di emissione)

(il Legale Responsabile dell'Azienda)
Sig. Fausto Lonati

1.9. MACHINE IDENTIFICATION RATING PLATE

Below is the location where the rating plate containing the machine identification data specified in the declaration of conformity is placed.

Figure No.1.9.a



View of the position where the machine identification rating plate is affixed

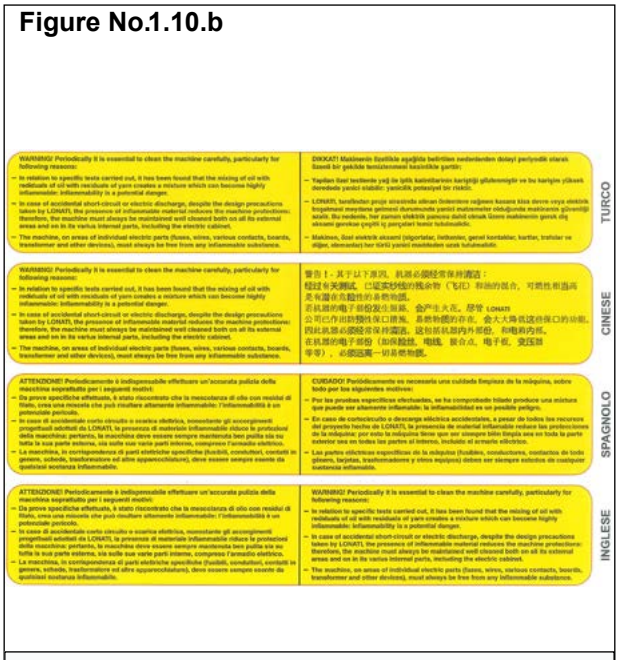
1.10. WARNING AND INFORMATION LABELS ATTACHED TO THE MACHINE

The position of labels containing specific warnings or recommended behaviour and information specifying the lubricant grade to be used, the make of machine needles or the main pneumatic connections is shown below.

Figure No.1.10.a

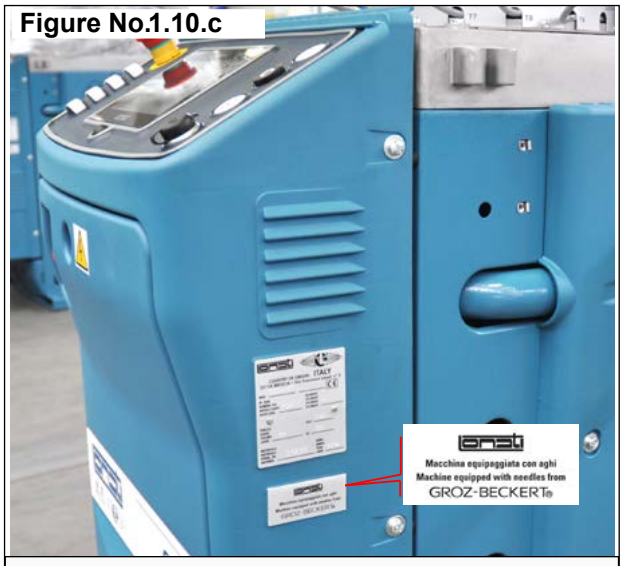
Position of the label showing the hazards resulting from failure to clean the machine

Figure No.1.10.b



Multi-language label according to the country of installation

Figure No.1.10.c

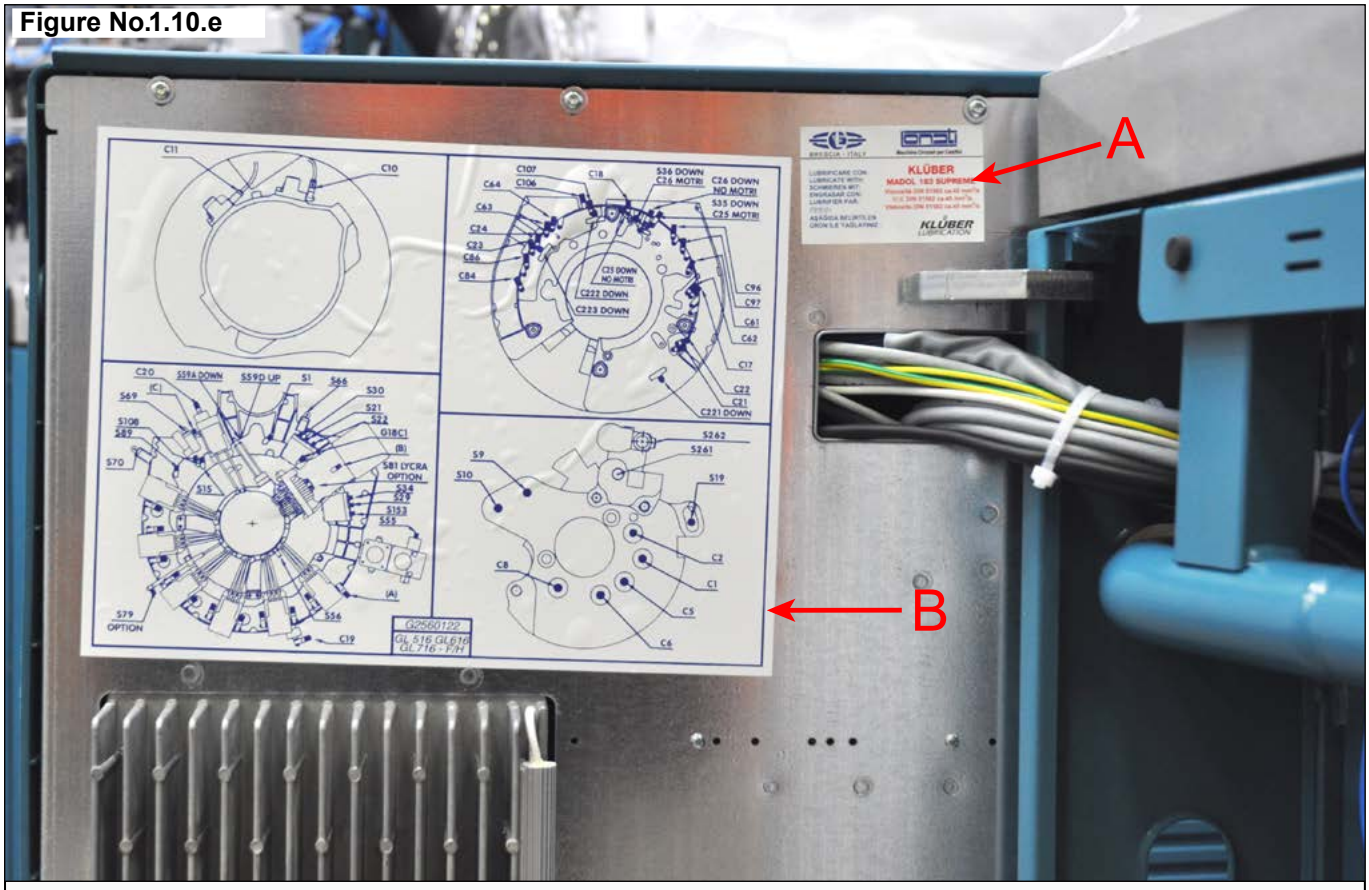


Position of the needle outfit label

Figure No.1.10.d

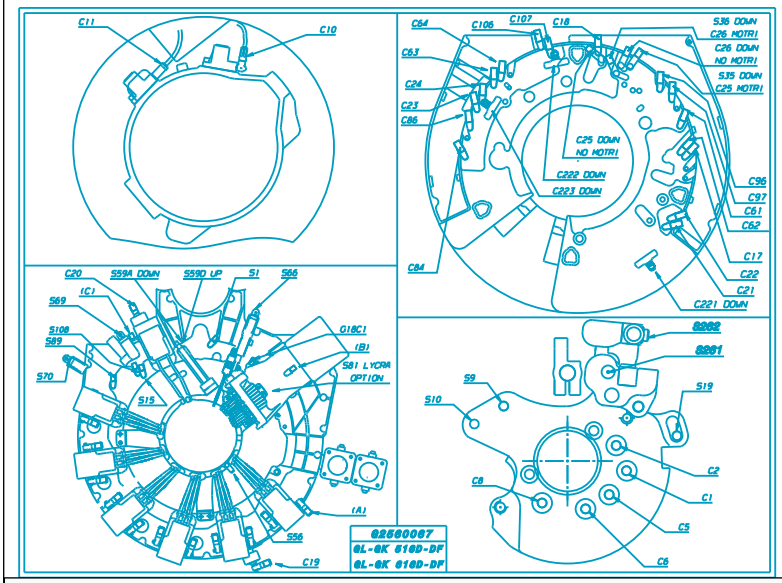
Position of the label warning not to turn the crank with machine open

Figure No.1.10.e



View of the position of labels inside the electronic control cabinet

Figure No.1.10.f



Compressed air connection label

"Reference B"

Figure No.1.10.g

Lubricants to use label

"Reference A"

1.11. MACHINE NOISE EMISSION

The emission of noise by a single machine is always within the limit established by EU machinery directive, according to the reference standard.

Nevertheless, the noise level inside the work environment (due to acoustic reflection from the floor, walls and ceiling) can exceed the legal limits as the result of the sum of noise issued by other machines in operation or any adjacent work or other noise sources.

This situation entails full responsibility on the part the employer, who is required to make personal protective equipment available to all its personnel.

Below is the table of noise generated by GK series machines.

TABLE OF MAXIMUM ACOUSTIC EMISSIONS MEASURED FOR GK SERIES MACHINES		
Sound-pressure level at the reference surface	LPA	79,5 dB
Sound intensity level	LWA	96,6 dB
PEAK		109,3 dB

1.12. LIST OF MACHINE SAFETY GUARDS AND SYSTEM AND RELEVANT FUNCTIONS

1.12.1. SAFETY PROTECTIVE DEVICES

The machine is supplied complete with special protections (guards, covers, doors, etc.), which prevent access to moving parts and electrical equipment; such protections are divided into two types:

FIXED: which are secured with fixing screws and in some cases with an attached plate showing appropriate removal instructions, and therefore they can be removed only with the aid of a suitable tool (screwdriver or wrench).

MOBILE: with an interlocking function (according to regulations in force), which stops and restarts the machine immediately, should they be moved from their standstill position.

A mobile protective devices acting as an interlock is the front door of the electrical cabinet, which before being removed using the wrench provided (included in the supply) requires the main interlocking main switch (L) to be in the O-OFF position.

Figure No.1.12.a

General view of the various protective devices

1.12.2. SAFETY SYSTEMS

The machine is provided with special safety systems that stop the machine or prevent it from restarting under particular conditions; the main ones are:

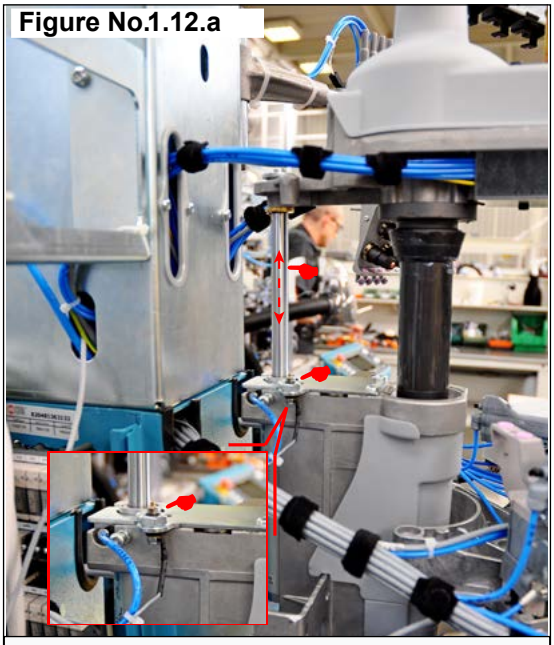
The MAIN SWITCH (L) placed on the front door of the electrical cabinet, which immediately cuts out the power supply to the machine when it is turned to O-OFF, and to this end it acts as the main interlock of the machine (according to local regulations).

The RED EMERGENCY BUTTON (A) is situated on the left side of the control panel and replicated laterally on the side of the sewing robot; it immediately stops the machine motors and all the operations whenever it is pressed in an emergency due to severe malfunctions, which could entail safety hazards for the operator and/or damage to the machine.

CUTTER STOP DEVICE for machines with welt raiser vertical shaft in the motorised version: it is part of the machine software and it activates automatically via access to “Plate raiser” or “Welt raiser” commands, a potentially hazardous situation if this protection is not enabled; access to the command menu is only provided via the machine stop button (B) which, besides stopping the machine and the rotation of the cutter, it gives access to the command menu on the machine display when it is held down for at least a second.

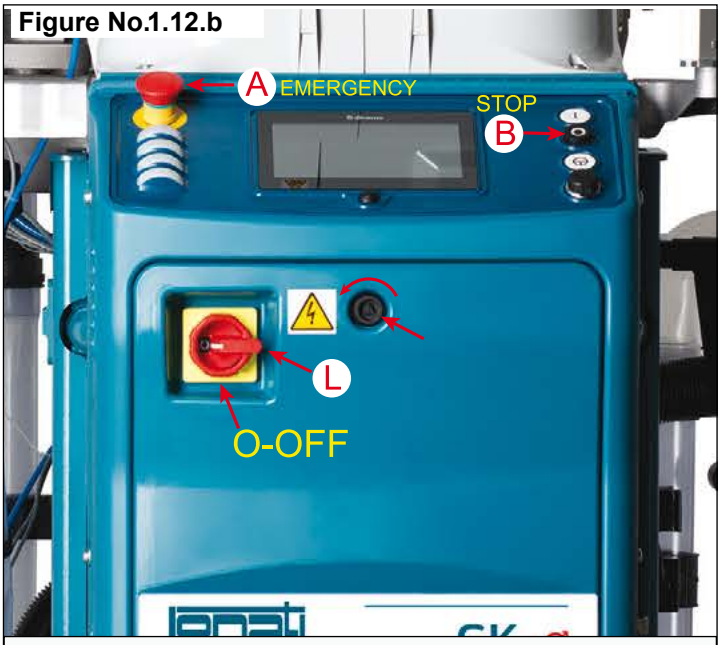
CUTTER STOP DEVICE for machines with welt raiser vertical shaft in the pneumatic version: when the welt horizontal unit moves to a hazardous position for the operator, the position of the horizontal welt unit is sent to the machine software via a position sensor and the machine software requests the activation of the cutter release procedure, which stops rotation and sets the machine in a safe position.

Figure No.1.12.a



Safety system for machines with welt raiser vertical shaft in the pneumatic version

Figure No.1.12.b



Electrical cabinet and control panel

1.13. PROPER AND IMPROPER USE OF THE MACHINE

Proper (expected) use of the machine is the one to be adopted in full accordance with the methods outlined in this chapter, under “Duties and prohibitions for the safety of operators and personnel with high-level tasks and skills” and as outlined in the Technical Characteristics - Dimensions and Consumption chapter and the Standard Maintenance chapter in this manual, according to type of production, mesh, performance and raw materials (e.g. yarns and lubricants) to be used on the machine.

Any use other than that described above is improper (or unexpected) and hence not to be implemented as it is incorrect.

Attention: The following is absolutely prohibited:

Any use of the machine other than those specifically specified by LONATI in the various chapters of this manual.

Using the machine beyond the limits prescribed by LONATI in this chapter entitled “Duties and bans for the safety of operators and all personnel with high-level tasks and skills” and the chapters “Technical dimensional characteristics and consumption” and Standard Maintenance in this manual.

1.14. DUTIES AND PROHIBITIONS FOR THE SAFETY OF OPERATORS AND ALL PERSONNEL WITH HIGH-LEVEL DUTIES AND SKILLS

In addition to the most basic precautions to be taken to ensure ongoing safety, each machine operator and member of staff with high-level duties and skills are required to comply with the “DUTY” and “BAN” situations described in this chapter.

1.14.1. MANDATORY REQUIREMENTS

It is a mandatory requirement for personal safety to comply with all the conditions listed below, namely:

1) In case of lack of adequate instructions or for any other explanations relating to the safe and proper use of the machine, only contact the supervisor and the safety manager.
2) The machine must be operated by skilled, reliable and properly instructed and trained personnel, who are authorised to perform their duties as assigned by their supervisor, namely in connection with the following points:
   - their own and others’ safety.
   - Correct operation and use of the machine.
   - Maintenance operations of the machine.
3) Before working on the machine ensure it is not possible to come into contact, even accidentally, with electrical parts that may have been carelessly left exposed, especially wires, switches, electric panels, electronic boards and other live parts.
4) Always switch the machine off completely before carrying out maintenance operations or services to prevent needless exposure to electrical/non-electrical risks.
5) If a malfunction or serious fault transpires which could jeopardise the safety of personnel press the red EMERGENCY button immediately and switch the machine off completely as an additional precaution (refer to section on switching off the machine) to prevent needless exposure to electrical/non-electrical risks. The fault should then be reported promptly to the relevant supervisor.
6) The machine must only be reconnected to the electricity supply and switched on again once the malfunction or serious fault has been eliminated by qualified technical personnel and the supervisor has given authorisation.
7) Ladders/platforms with personal protective equipment (PPE) or other standard systems must be used when fitting or replacing yarn distaves in the highest sections of the reel stand framework, to ensure personal safety and avoid falls onto the machine and/or ground.
8) Always wear appropriate PPE (protective gloves, safety goggles, anti-mist masks, ear defenders etc.) as instructed by the safety manager to prevent exposure to various types of risk.
9) Before putting on protective gloves to work on the machine always switch it off completely to prevent needless exposure to mechanical hazards.
10) Always strictly observe safety notices attached to machine lines by the safety manager.
11) Always strictly observe warnings on containers for commercial products required to use, service and clean the machine. In particular, comply with specific warnings highlighted by the safety manager.

12) Cleaning staff operating in the machine work area must always comply with instructions provided by the safety manager, especially in relation to floor cleaning, the use of recommended commercial products, and the frequency of cleaning operations.
13) Always wear protective work clothing approved by the safety manager with elasticated cuffs and ankles that complies with existing legislation, to prevent entanglement in moving parts.
14) Operators and supervisory staff with long hair, plaits or ponytails must use suitable headwear to keep hair in place.

1.14.2. BANS

In the interests of personal safety the following are prohibited:

1) Unauthorised or unqualified personnel carrying out electrical repairs, tampering with or attempting to repair electrical devices for the machine and its accessories.
2) Carrying out operations on the machine and its accessories outside areas of responsibility without written authorisation from a supervisor or safety manager so personal/collective safety is not compromised.
3) Wearing excessively wide clothing with sleeves which are very long/wide, loose cuffs, billowing collars, hems or frills, ties, scarves or pashminas.
4) Wearing rings, bracelets, belts, necklaces and pendants in general.
5) Working on the machine when not fully fit due to tiredness, illness of any type, or the consumption/abuse of alcohol, recreational drugs, medicines or other substances that may cause a loss of balance, unconsciousness and/or drowsiness.
6) Smoking and/or using naked flames when operating the machine as the yarns and their deposits on the machine may be highly flammable.
7) Smoking or discarding cigarettes/cigar ends, matches etc. when operating the machine or near the machine in order to prevent fire.
8) Working with open wounds however small they may be, and letting them come into contact with parts of the machine, dirty rags, and the various objects used in the machine.
9) Operating without safety goggles in situations involving moving parts or parts sprayed with oil.
10) Carrying out operations with wet or damp hands in order to prevent risk caused by direct/indirect contact with electrical parts.
11) Attempting to stop or slow down moving parts with the hands or other parts of the body, or tools and objects of any type; physical contact with any moving part of the machine must always be avoided.
12) Carrying out maintenance or other operations with the machine operating and in particular, always avoid lubricating or greasing moving parts manually and accessing or working on live parts.
13) Using work tools, instruments etc. for the machine inappropriately.
14) Leaving work tools, instruments or other objects on the machine after using them, so they do not fall among moving parts posing a risk to personnel and potentially damaging the machine.

15) to remove and/or tamper with machine protections and safety devices (guards, shields, sensors, electronic stops, etc.), therefore the machine must not be operated without any of its protections and safety devices in place and none of them shall be faulty or tampered with.
16) Using hands for maintenance operations on needles, jacks, sinkers, dial jacks, needles or other sharp parts without using tools to protect against injury, which should be provided by the supervisor.
17) Placing hands near the cutter unit when it is in the upper position and manual feed mode.
18) Placing hands near the needle holder and sinker cylinder unit when the machine is in manual feed mode for maintenance operations.
19) to go beyond the safety guards for any types of intervention with the machine running.
20) Operating without protective headwear if the reel stand is fitted directly on the machine and could create a hazard for operators and cause the head to be struck against reel stands.
21) Stopping or loitering in or near the machine's range of operation when lifting, shifting or implementing similar operations for installation purposes, to prevent personal safety being compromised.

1.15. MANDATORY REQUIREMENTS AND BANS RELATING TO CORRECT MACHINE USE

Machine operators are held to comply with the instructions outlined below.

1.15.1. MANDATORY REQUIREMENTS

It is a mandatory requirement for personal safety to comply with all the conditions listed below, namely:

1) There must always be sufficient space to access each side of the machine so it can be worked on without difficulty. If this is not the case notify a supervisor immediately.
2) There must always be sufficient lighting over the machine, especially in areas where normal threading operations take place (reel stand, yarn finger areas etc.) and needles and general textile accessories are replaced. If this is not the case notify a supervisor immediately.
3) Before using the machine carry out the routine checks and maintenance outlined in the Standard Maintenance chapter in the relevant section.
4) Hosiery items produced by the machine must be dispensed and sorted as outlined in the Use chapter in the section on waste materials produced by the machine.
5) If a malfunction or serious fault transpires which could jeopardise the safety of personnel, press the red EMERGENCY button on the control panel immediately and switch the machine off completely as an additional precaution, as outlined in the Use chapter in the section on switching the machine off, to prevent needless exposure to electrical/non-electrical risks. The fault should then be reported promptly to the relevant supervisor.
6) The machine must only be reconnected to the electricity supply and switched on again as outlined in the Use chapter in the section on switching the machine on once the malfunction or serious fault has been eliminated by qualified technical personnel and the supervisor has given authorisation.
7) Only use the raw materials stipulated by the supervisor (yarns, lubricants etc.) in accordance with the instructions in this manual, as outlined in the Technical Characteristics - Dimensions and Consumption chapter in the sections on consumption data and specifications and dimensions and weights.

1.15.2. BANS

In the interests of personal safety the following are prohibited:

1) Do not use the machine in a manner which does not comply with its technical and production characteristics outlined by the supervisor in accordance with the operating instructions in the Technical Characteristics - Dimensions and Consumption and Standard Maintenance chapters.
2) Do not disconnect the machine from the power supply by pulling the power cable.
3) Do not insert foreign objects of any kind in the machine's electrical cabinet, especially when it is operating.
4) If the machine is splashed with liquids and/or substances of any type, with the exception of specific machine lubrication products, press the red EMERGENCY button on the control panel immediately and switch the machine off completely as an additional precaution, as outlined in the Use chapter in the section on switching the machine off, to prevent needless exposure to electrical/non-electrical risks. The incident should then be reported promptly to the relevant supervisor.

1.16. MACHINE OPERATING RANGE

For reasons of safety, the machine operating area must be easily visible and bordered with continuous yellow lines approximately 10 cm thick on the floor, which can withstand fiction from industrial footwear and the action of any oil and grease deposits. If the yellow lines fade over time and are no longer visible they must be repainted as soon as possible.

Furthermore, suitable signage which is clearly visible should be installed near the work area prohibiting access to unauthorised persons.

No access for unauthorised personnel

1.17. EMERGENCY FIRE SITUATIONS

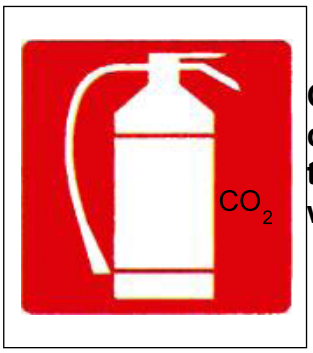
In the event of fire the following must never be used:

1) Water and hydrants in general as this equipment could be extremely dangerous in the case of contact with live parts on the machine and its accessories.
2) Foam or powder extinguishers as this equipment could make the machine and its accessories unusable.

In the event of fire proceed as follows:

1) Only use carbon dioxide (CO2) extinguishers which should be situated near the machine and in areas easily accessible to everyone.
2) In the event of fire supervisors must isolate the machine from pneumatic and electricity supplies immediately in accordance with the instructions outlined in the chapter on Additional Safety Standards for the Installation, Use and Maintenance of the Machine in the section on installation and maintenance safety procedures, but only if there is enough time for these operations to be implemented and there is no risk to the safety of personnel.

Do not use water to extinguish fire on electrical parts.



Only use carbon dioxide extinguishers to put out fires in the workplace.

IMPORTANT! To prevent the risk of fire the machine must be kept clean in accordance with the instructions in the Standard Maintenance chapter in the section on routine machine cleaning.

All personnel must be suitably trained on the correct use of extinguishers in the event of an emergency.

2 ADDITIONAL SAFETY STANDARDS FOR THE INSTALLATION, USE AND MAINTENANCE OF THE MACHINE

2.1. GENERAL STANDARDS FOR INSTALLATION AND MAINTENANCE OPERATIONS

All supervisory staff must read and fully understand the instructions contained in chapter 1 before also reading and understanding the instructions in chapter 2.

The failure of any member of staff in complying with the instructions contained in chapters 1 and 2 could compromise personal/collective safety and/or damage the machine, for which LONATI cannot be held liable in any way. Employers must provide appropriate training and information for employees in accordance with existing legislation in the country of use and the qualifications of the personnel employed.

On the basis of existing legislation, chapter 2 provides additional information for supervisory staff and the sections in this chapter also contain standard instructions for qualified personnel on the appropriate use of the machine in safe conditions.

Before anyone uses the machine the supervisor must make a copy of the full manual available.

Note: The failure of personnel at any level in complying with the instructions in this manual will invalidate the LONATI machine guarantee; in this regard, operators must be reminded that they should only carry out the machine operations contained in chapter 1, depending on their skill level.

It is strictly prohibited for any member of qualified personnel to use the machine in the following cases:

1) If it cannot be demonstrated that this manual, especially chapter 1 and chapter 2, have been read and fully understood.
2) There are any doubts on the perfect safety conditions of the machine.
3) If, after reading the operating instructions in full, there is insufficient training and/or experience at any skill level to carry out the operations required by the machine safely.
4) All the machine safety guards and devices are not installed or do not function properly.
5) If clarification or further information when using the machine safely at any skill level is required contact the LONATI technical support team.

For anything you may require regarding the machine, please contact the LONATI Technical Service at the following address:

ADDRESS and CONTACTS	
MAIL ADDRESS:	Lonati S.P.A., 3 Via Francesco Lonati, 25124 Brescia, Italy
WEBSITE:	http://www.lonati.com
TELEPHONE:	0039 030 23901
FAX:	0039 030 2310024

2.2. ADDITIONAL RESIDUAL RISKS TO THE SAFETY OF QUALIFIED PERSONNEL

The table of additional residual risks to the safety of qualified personnel due to installation and maintenance operations, outlined later in this section, is a supplement to the table in chapter 1.2 and lists risks (possible sources of accident on the basis of existing legislation), the machine areas involved with corresponding operational phases (location of parts near residual risks or operational phases that trigger them), potential circumstances and extent of additional residual risks on the basis of solutions adopted.

Note: All qualified personnel must also consider the risks mentioned in chapter 1 section 1.2 as well as the aforementioned additional residual risks.

The number and extent of residual risks identified in the table of additional residual risks to the safety of qualified personnel in this section will not increase if qualified personnel avoid tampering with machine guards and safety features, in accordance with instructions in chapter 1 on the section on obligations and bans for the safety of operators and supervisory staff, and the chapter on additional obligations and bans for the safety of qualified personnel outlined here in chapter 2.

TABLE OF ADDITIONAL RESIDUAL RISKS DUE TO INSTALLATION AND MAINTENANCE OPERATIONS			
HAZARD	**MACHINE AREAS**	**POSSIBLE SCENARIO**	**EXTENT OF RESIDUAL RISK**
FIRE	Electrical parts specific to the inside of the electrical cabinet and electrical system on the machine (fuses, wires, contacts in general, boards, transformer and other equipment)	Inspections conducted while holding lit cigarettes, cigars and matches or a naked flame Maintenance operations performed with cigarettes, cigars, lit matches or naked flames Accidental contacts with lit cigarettes, cigars and matches or a naked flame Short circuit Electrical discharge Presence of highly flammable mixtures consisting of oil and yarn residue	Slight residual risk by affixing clearly visible panels, showing specific signs and warnings regarding the ban on smoking or using naked flame within the machine operating range Slight residual risk with regular inspection and thorough cleaning of all external and internal machine parts as outlined in the Standard Maintenance chapter
BURNS AND SCALDINGS	Main motor Electro-extractor motor All machine stepper motors and attached devices	Checks Maintenance operations Accidental contact	Slight residual risk using suitable safety gloves, only with the machine stopped

TABLE OF ADDITIONAL RESIDUAL RISKS DUE TO INSTALLATION AND MAINTENANCE OPERATIONS			
HAZARD	**MACHINE AREAS**	**POSSIBLE SCENARIO**	**EXTENT OF RESIDUAL RISK**
DIRECT AND INDIRECT ELECTRICAL CONTACT	Electrical parts specific to the inside of the electrical cabinet and electrical system on the machine (fuses, wires, contacts in general, boards, transformer and other equipment)	Checks with the machine powered Maintenance operations with the machine powered Accidental contact with the machine powered	Slight residual risk depending on the electrical cabinet's protection level Slight residual risk depending on the presence of a special safety key for the exclusive use of authorised personnel to open and close the cabinet door to access electrical parts. Slight residual risk depending on the presence of safety notices

2.3. ADDITIONAL MANDATORY REQUIREMENTS AND BANS FOR THE SAFETY OF QUALIFIED PERSONNEL

In addition to the obligations and bans outlined in chapter 1 in the section on obligations and bans for the safety of operators and supervisory staff, qualified personnel must also comply with the additional obligations and bans outlined in this section.

2.3.1. ADDITIONAL REQUIREMENTS

In the interests of personal safety it is compulsory to comply with the additional conditions outlined below, therefore:

1) Before switching the machine on using the main switch (L), as outlined in chapter 1 in the section listing machine safety features and their operation, operators must read and fully understand the contents of chapter 1 in this manual.
2) If any machine documents are missing (including this manual) or if further clarification is required on safety and the correct use of the machine, contact the LONATI TECHNICAL SUPPORT DEPARTMENT via the methods outlined at the beginning of chapter 2 or the LONATI representative based in the country of use.
3) Machine personnel must always use the safety features provided, as outlined in chapter 2 in the section on required safety equipment.
4) During installation connect the machine to earth as outlined in the Installation chapter in the section on connecting to the electricity supply, to prevent personnel from exposure to risks caused by electrical discharges due to contact with metal machine parts, and protect the machine from potential electrical disturbances.
5) When working on the machine, personnel authorised to carry out electrical repairs must always ensure electrical parts are not left exposed, especially wires, switches, electric panels, electronic boards and other live parts, so that accidental contact can be avoided.
6) Always carefully check that there are no electrical parts on the machine that are uncovered, damaged or inefficient, such as wires, cables, sheathes, contacts, etc.
7) Before working on the machine's electrical parts always isolate it from the electricity supply in accordance with the instructions here in chapter 2 in the section on safety procedures for installation and maintenance operations, to prevent needless exposure to electrical risks.
8) Personnel authorised to carry out electrical repairs on the machine and similar operations must use suitably insulated tools, as outlined in chapter 2 in the section on safety equipment, to prevent needless exposure to electrical risks.
9) Before resuming work, check the efficiency and integrity of all the guards and safety devices, which must only be used for the purpose for which they were designed.
10) Operations on the machine which cannot be carried out with it being isolated from pneumatic and electricity supplies beforehand due to processing reasons, as outlined in chapter 2 in the section on safety procedures for installation and maintenance operations, must still be implemented with all guards in place and safety devices enabled and operating correctly. The safety features required for carrying out these operations must also be used appropriately, in accordance with the section on required safety equipment in chapter 2.

11) Users must define and ensure personnel carrying out operations on the machine and its accessories use the safety equipment outlined here in chapter 2 in the section on required safety equipment, establishing the need for anti-mist masks and ear defenders in accordance with existing legislation in the country of use. Users must carry out the following checks beforehand:
    - Accurately measure the concentration of dust and atomised oil emitted in the weaving room by all the machines operating under normal conditions.
    - Accurately measure the noise level produced in the weaving room by all the machines operating under normal conditions.
12) Personnel involved in cleaning the workplace must be provided with clear and unambiguous instructions, especially as regards cleaning the floor, using specific products and following the cleaning time schedule, based on the rules of law in force in the country of use.
13) Never make modifications to the machine or change it in any way, since damage or injury caused by operations not authorised by LONATI will relieve the manufacturer from all liability whatsoever.
14) If any changes are made to the safety regulations after delivery of the machine by LONATI, responsibility for complying with the new safety rules lies entirely with the user.
15) If the machine is bought used, the user must check that all the guards and safety devices comply with the applicable rules of law in force in the country of use.

2.3.2. ADDITIONAL BANS

In the interests of personal safety the following are prohibited:

1) Having equipment, tools or any other objects that could limit the free movement and actions of machine personnel within the machine operating area.
2) Removing and/or tampering with machine safety equipment (guards, screens, sensors, electronic stops etc.) unless absolutely necessary for special maintenance operations. In such cases the machine must be disconnected from the electricity supply in accordance with the instructions in chapter 2 in the section on safety procedures for installation and maintenance operations, to prevent needless exposure to electrical/non-electrical risks. After carrying out the required operation replace any safety features removed temporarily before reconnecting the machine to the electricity supply.
3) Circumventing and/or putting safety features out of service deliberately. This is a criminal offence under EU legislation (implementation of directive 89/391/CEE).

2.4. ADDITIONAL OBLIGATIONS AND BANS RELATING TO CORRECT MACHINE USE

Operators must always comply with the instructions in chapter 1 regarding the obligations and bans relating to correct machine use depending on their skill level, and qualified personnel must comply with both the instructions in chapter 1 and those outlined in this section.

2.4.1. ADDITIONAL MANDATORY REQUIREMENTS RELATING TO CORRECT MACHINE USE

It is essential to comply with the following conditions:

1) There must be sufficient space to access each side of the machine so it can be operated on without difficulty, therefore the machine operating area must be restricted such that the space required for use and maintenance is available.
2) There must always be sufficient lighting over the machine, especially in areas where normal threading operations take place (reel stand, yarn finger areas etc.) and needles and general textile accessories are replaced.
3) Before installing the machine check that the electrical voltage and frequency values on the plate on the side of the electrical cabinet correspond to those of the local supply.
4) Before installation ensure the electricity supply for each individual machine is protected with a magneto-thermal safety switch and if not take steps to arrange this.
5) During installation connect the reel stand framework to earth to prevent the machine being affected by electrical disturbances (due to electrostatic discharge).
6) During installation connect the machine to earth to prevent personnel from exposure to risks caused by electrical discharges due to contact with metal machine parts, and protect the machine from electrical disturbances.
7) When replacing machine parts only use original LONATI parts, otherwise LONATI cannot be held liable.
8) The request to purchase any machine component, even if on the market under a specific manufacturer's or supplier's brand, must be submitted to LONATI directly, indicating all necessary details as outlined in the parts catalogue. See page on ordering parts directly or online in the parts catalogue section after registering and obtaining a password.
9) LONATI cannot be held liable for machine components purchased from a manufacturer/supplier other than LONATI.
10) If it is absolutely necessary to carry out work on the machine which involves the formation and spread of shavings, clean the machine thoroughly after the operation is completed and check no fragments have remained inside, especially among moving parts and electrical parts. If this has occurred remove them immediately and only operate the machine again once a supervisor has given authorisation.
11) In the event of long periods of inactivity adopt the protective measures outlined in the Maintenance During Stoppages chapter to prevent the machine from deteriorating.
12) Machine waste materials (packaging, yarn scraps etc.) must always be disposed of in accordance with existing legislation in the country where the machine is in use.
13) Machine waste lubricants are contaminants and must always be disposed of in accordance with existing legislation in the country where the machine is in use.

14) The machine must be decommissioned and demolished (when it needs to be replaced or disposed of) in accordance with the instructions in the Machine Decommissioning and Disposal Guidelines chapter.

2.4.2. ADDITIONAL BANS RELATING TO CORRECT MACHINE USE

The following are prohibited:

1) Making temporary connections to the central extraction system, central compressed air system or electricity supply during and after installation. Connect the machine as outlined in the Installation chapter in the sections on connecting to the central compressed air system, connecting to the electricity, and installing the machine software.

2) Carrying out modifications to the machine and its accessories or adding on electrical devices (motors, solenoid valves, electromagnets etc.) or control components (contactors, relay switches etc.) without using suitable protection designed to prevent the machine from being affected by electrical disturbances. For example, if backup electronic outputs are used on the machine to control additional electrical devices (especially solenoid valves and electromagnets) with identical characteristics to those already present and controlled in a similar manner, no issues should arise. However, if these devices have different characteristics, their potential use in the event of excessive current being drawn could damage the machine's electronic circuits or cause other devices to malfunction. In the case of additional electric devices not controlled directly by the machine's electronics, a typical scenario would be relays or contactors controlled by backup electronic outputs on the machine, which would in turn control other devices probably equipped with more power (in particular, large electromagnets, large solenoid valves, electric motors of any type etc.). In all of these situations suitable protection must be used to prevent the generation of disturbances in the machine's electronics. Typical protective features to adopt are as follows:
   - Diode connected anti-parallel to the coil of any additional electric devices, but only if they are DC-powered.
   - Transient suppressor (MOV) connected in parallel with the coil or winding of any additional electronic devices, especially if they are AC-powered.
   - RC filters connected in parallel with any relays, contactors etc. which control motors or considerable inductive loads.

Attention: If it is necessary to add an electrical device contact the LONATI Technical Support Department to request written authorisation relating to the type of protection required, its size and any other specific requirements.

3) Carrying out modifications to the machine or its electronic equipment, or adding and connecting accessories that are not part of the devices provided and deemed suitable by LONATI, as by doing so LONATI cannot be held liable for any loss.

4) LONATI cannot be held liable for machine components purchased from a manufacturer/supplier other than LONATI.

5) Carrying out any work directly on the machine that involves the formation and spread of shavings of any kind, unless absolutely necessary.

Attention: If it is absolutely necessary to carry out work on the machine which involves the formation and spread of shavings, clean the machine thoroughly after the operation is completed and check no fragments have remained inside, especially among moving parts and electrical parts. If this has occurred remove them immediately and only operate the machine again once a supervisor has given authorisation.

2.5. SAFETY PROCEDURES TO FOLLOW DURING INSTALLATION AND MAINTENANCE

1) During installation or maintenance it is compulsory to place a clear and easily visible sign on the machine next to the emergency button or on the machine control panel with the following wording:

Figure No.2.5.a

Position signs with specific wording relating to the type of operation in progress

MACHINE BEING INSTALLED!
MACHINE BEING SERVICED!

Attention: In the two cases indicated, if the installer, maintenance or repair technician is absent the machine must be switched off completely as outlined in the Use chapter in the section on switching off the machine.

2) In specific cases a clearly visible notice must be placed in the following positions showing, for example, one of the following:

Position a sign on the machine with the wording:

Tuning In Progress
Lubrication In Progress

Position a sign on the line with the wording:

Beware!
Floor slippery due to oil and grease

2.5.1. PROCEDURE FOR ISOLATING THE MACHINE FROM PNEUMATIC AND ELECTRICITY SUPPLIES

3) When any interventions are required on the machine (e.g. installation, maintenance, repairs, replacement of parts, settings or modifications), it is important to switch off the electricity and compressed-air supplies, as instructed below, only one person must be assigned to the task in such cases.

Procedure for switching off the electricity supply

1) Select function F3 on the machine display to end the machine cycle.
2) Turn the dial of the main switch (L) on the front door of the electrical cabinet to the O-OFF position.
3) Disconnect the machine power supply cable from the mains socket.
4) Set up a notice reading as follows in a clearly visible position:

MACHINE POWERED OFF!

Figure No.2.5.a

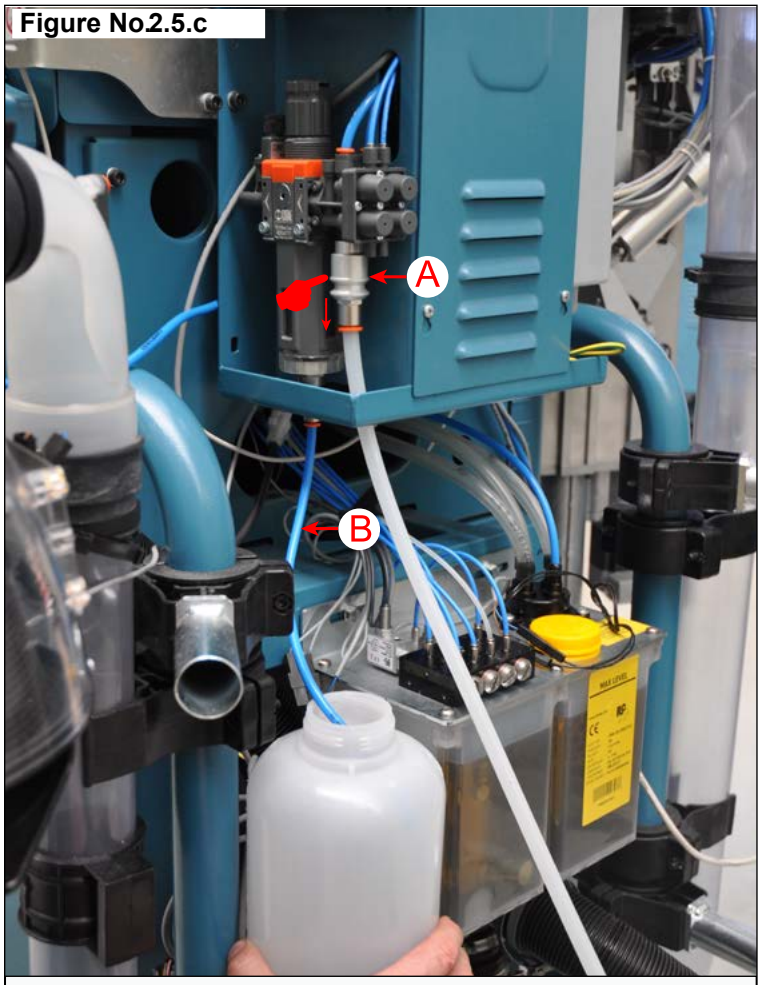
Position signs with specific wording relating to the type of operation in progress.

Figure No.2.5.b

Turn the main switch (L) to the O-OFF position.

Procedure to isolate the machine from the pneumatic supply

Figure No.2.5.c



Lower the sleeve (A) to shut off the pneumatic supply.

5) Insert a piece of tube (B) 8 mm in diameter in the joint on the pressure regulator tank, then insert the rib in a container to collect any condensation.

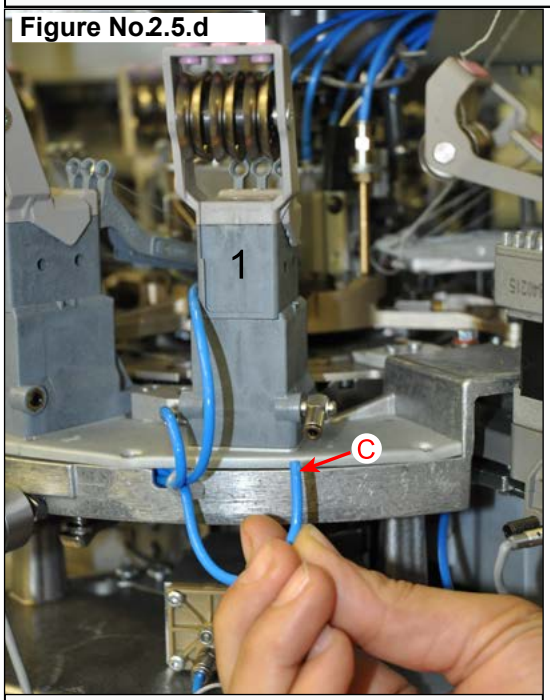
6) Shut off the compressed air supply to the machine by lowering the sleeve (A) to the pressure regulator (also closing the condensation drain).

7) Release the pneumatic supply rib (C) to colour drop 1, discharging the residual air into the machine circuit.

8) Set up a notice reading as follows in a clearly visible position:

MACHINE ISOLATED FROM PNEUMATIC SUPPLY

Figure No.2.5.d



Release the tube (C) to discharge the residual air.

Figure No.2.5.e

Position signs with specific wording relating to the type of operation in progress.

2.6. SUITABILITY OF PERSONNEL

1) All necessary machine operations must only be implemented by personnel that meet the age requirements of existing legislation in the country where the machine is in use.
2) Suitably trained and qualified personnel must be employed to operate and service the machine, and their responsibilities explained fully and clearly, especially in relation to personal/collective safety and any special tasks to be implemented.

Attention: All operations on the machine's electrical, pneumatic and lubrication systems must only be carried out by qualified authorised personnel.

2.7. REQUIRED SAFETY EQUIPMENT

The standard requirements for safety equipment to be used by all personnel must comply with the following in particular:

1) Protective work clothing with elasticated cuffs and ankles; the following notice should be displayed at the entry to the machine line:

WEAR PROTECTIVE EQUIPMENT

2) Safety footwear with special reinforcements and anti-slip soles; the following notice should be displayed at the entry to the machine line:

SAFETY FOOTWEAR COMPULSORY

3) Personal protection equipment: safety gloves, which must be suitable for the type of operation and the hazardous nature of the parts to be handled or near which it is necessary to operate; safety goggles and, if required by the rules of law in the country of use, antismog masks and hearing protectors. Interventions must always be performed with the machine switched off.

The following notices should be displayed at the entry to the machine line, see example:

SAFETY GLOVES COMPULSORY BUT ONLY WITH MACHINE OFF

4) Special suitably-insulated tools for electrical repairs, for the exclusive use of qualified personnel.

5) Suitable safety notices must be positioned along the entire production line in accordance with the rules of law in force in the country of use.

It is important, however, for the notices to include the following types of safety requirements for all personnel and for correct use of the machine:

NO NAKED FLAMES

SMOKING IS PROHIBITED

DANGER HIGH VOLTAGE

6) Clear, easily visible warnings relating to the use of commercial products required to use, service and clean the machine must be outlined on the product containers.

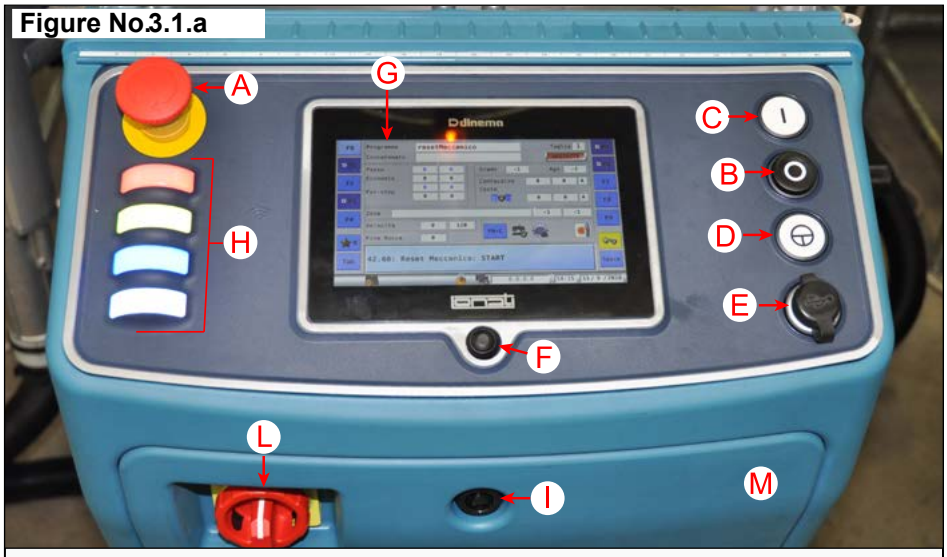
3 OPERATING COMMANDS

All external controls on the door of the cabinet with electronic equipment including those on the control panel are illustrated in this chapter.

The detailed functions of operational controls on the control panel are specified in the User Interface Manual.

3.1. COMPONENTS OUTSIDE THE ELECTRICAL CABINET AND CONTROL PANEL

Figure No.3.1.a



Operational controls on the door of the cabinet with electronic equipment

A: Red emergency push-button (with self-locking) stops the machine motor and all systems operating immediately.

B: Machine Stop Button, with an additional function: when it is held down for at least a second, a window appears displaying the relevant “Plater raiser” and “Welt raiser” commands (only available for machines with motorised welt raiser vertical shaft).

B: Machine Stop Button (without additional functions, only fro machine with pneumatic welt raiser vertical shaft).

C: Machine start button.

D: Button with electronic handle function to slowly rotate the cylinder, activates the machine display showing the operational window containing various feed options.

E: USB input to insert/remove various machine programs.

F: HOME button to go back to the main menu immediately.

G: Colour touchscreen display that shows the windows managing the machine program.

H: Machine status light unit - the 4 sections of the light unit (H) consisting of 4 bulbs (also called traffic lights) show personnel the machine status without requiring manual verification; each section lights up with different colours depending on machine status.

I: Door shutter (M) to access the machine boards.

L: Main ON-OFF switch.

M: Front door to access the electrical cabinet - only qualified personnel may open this.

Attention: Only qualified technical personnel should be authorised to work inside the electrical cabinet.

Authorised personnel must be appointed in accordance with EN 60204-1 point 3.19 (person notified at 3.31 and person instructed at 3.53).

4 USE

4.1. MAIN WORK POSITION OF THE MACHINE.

The machine work process is implemented via continuous automatic cycles until the machine is stopped by pressing either the red EMERGENCY button or the STOP O button on the control panel. It may also stop automatically and shut down for various reasons, whereby the operator should intervene in accordance with the maintenance operations outlined in the Standard Maintenance chapter, and remain positioned near the front of the machine.

4.2. LOADING YARN REELS ON THE REEL STAND

Fit all yarn reels correctly on the reel stand to feed the various yarn fingers on the machine to produce the required item.

Pass the yarn from the reel stand through the rings and/or tubes to enable an efficient feed mechanism to the yarn finger as outlined in the section below on threading the yarn fingers.

4.3. THREADING THE YARN FINGERS

Each yarn coming from the reel stand fitted previously should be carefully inserted in the various yarn fingers for each feed or drop, depending on their specific function and the item to be produced.

To this effect, follow the instructions provided by supervisors. Use suitable yarn trappers provided by a supervisor to thread yarn fingers.

4.4. STOPPING THE MACHINE IN EMERGENCY SITUATIONS

In emergency situations resulting from serious irregularities that could jeopardise the safety of personnel and/or machine integrity, press the red EMERGENCY button (A) to stop the machine as quickly and safely as possible, even though the main switch (L) remains in the I-ON position and the machine is still powered.

The red EMERGENCY button (A) will remain pressed automatically even if released until it is manually extracted from this position.

Restoring the red EMERGENCY (A) button does not cause the machine to move.

Figure No.4.4.a

Operational commands on the control panel

4.5. PROCEDURE FOR SWITCHING THE MACHINE OFF COMPLETELY

If it is necessary for any reason to switch the machine off completely follow the procedure outlined in the following 3 situations:

Quick procedure with machine in production and loss of hosiery item

1) Press the STOP button (B).
2) From the machine menu select F3 via the display (this ensures the machine stops at the end of its cycle without starting another).
3) In the machine menu, select F0 and the (C) START button to allow the machine to complete the cycle in the shortest possible time, and the sock must clearly be eliminated.
4) Turn the main switch (L) to the O-OFF position to cut the machine's electricity supply off completely.

Standard procedure with machine in production and without loss of hosiery item

1) From the machine menu select F3 via the display (this ensures the machine stops at the end of its cycle without starting another).
2) Wait for the machine to complete the sock knitting cycle.
3) Turn the main switch (L) to the O-OFF position to cut the machine's electricity supply off completely.

Standard procedure with machine stopped at end of cycle

1) Turn the main switch (L) to the O-OFF position to cut the machine's electricity supply off completely.

Figure No.4.5.a

Operational commands on the control panel

Figure No.4.5.b

Turn the main switch to the O-OFF position.

Attention: If checks and operations on the machine's electrical parts are required, after turning the main switch (L) to the O-OFF position disconnect the machine's power supply cable from the mains socket to prevent exposure to electrical risks.

If the machine needs to be isolated from the electricity supply this should only be carried out by authorised technical personnel, in accordance with the Additional Safety Standards for the Use, Installation and Maintenance of the Machine chapter in the section on the safety procedure for installation and maintenance operations.

4.6. SWITCHING ON THE MACHINE

After being off completely the machine should be switched on as follows:

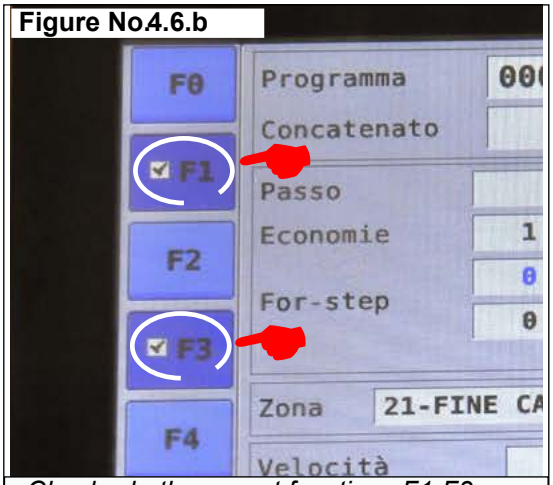
Attention: If the machine's power supply cable has been removed from the mains socket always ascertain the reason why before reconnecting to the supply, and only reconnect if the machine is sound and operating correctly.

1) Plug the machine power supply cable into the mains socket.
2) From the front door on the electrical cabinet turn the main switch (L) to the I-ON position to connect the machine to the electricity supply.
3) After resetting the operating system the machine can be restarted by pressing the START button (C) on the basis of the procedure used to switch it off, as outlined previously. Check the following functions are not enabled otherwise the programmed cycle may stop or not commence.
4) F1: chain stop (with this command enabled the machine will restart but stop at zero in the chain).
5) F3: end cycle (with this command enabled the machine will start producing a hosiery item according to the machine program but will stop at the end of the cycle).

Figure No.4.6.a

Operational commands on the control panel

Figure No.4.6.b



Check whether or not functions F1-F3 are enabled

4.6.1. RESTARTING THE MACHINE AFTER A MANUAL STOP USING THE RED EMERGENCY BUTTON

Restarting the machine after manually stopping it using the red EMERGENCY button (A) on the control panel is possible regardless of the position of the machine production cycle.

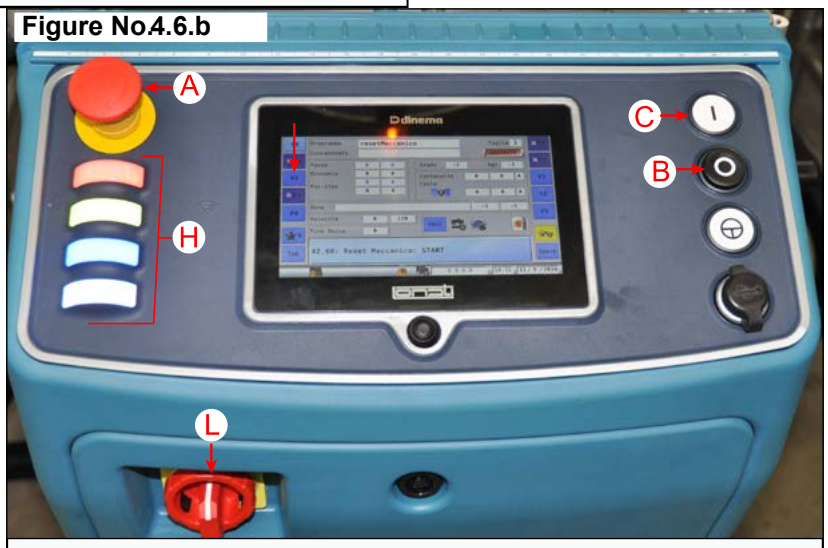
After checking the machine is ready to restart proceed as follows:

Figure No.4.6.a

MACHINE EMERGENCY Signal

1) Turn the red EMERGENCY button (A) to the operating position.
2) Select function F8 after the MACHINE EMERGENCY alert appears on the display.
3) Press (C) START on the machine control panel.

Figure No.4.6.b



Operational commands on the control panel

4.7. GENERAL PROCEDURE FOR STARTING THE MACHINE

Carry out the following procedure before starting the machine:

1) Check all yarn reels for feeding the various yarn fingers required to produce the item being implemented have been fitted correctly on the reel stands and that these are not worn. If necessary replace worn or missing yarn reels as outlined in this chapter in the section on loading yarn reels on the reel stands.
2) Check the yarn fingers for each feed to produce the item being implemented are being fed correctly with the yarn, otherwise thread any empty yarn fingers as required, in accordance with the section on threading yarn fingers in this chapter.
3) Check the integrity and efficient operation of the following parts of the machine:
   - The touchscreen display and all buttons on the control panel.
   - The ON-OFF switch on the door of the electrical cabinet.
   - Check that the device to stop the cutter has not been disturbed and is always active.

4.8. STARTING THE MACHINE AFTER A FAULT

After the machine has shut down following an alert flagged on the control panel display, the cause of the alert will have to be removed before the machine is restarted.

Some machine faults displayed on the control panel and illustrated fully are easy to resolve i.e. the cause is outlined in the description of the message and the corrective action to be taken can be deduced and implemented by an operator.

After normal machine operation has been resumed select function F8 on the main menu and start the machine using the START button (C).

Figure No.4.8.a

Example of fault message that stopped the machine

Figure No.4.8.b

Operational commands on the control panel

All other machine fault messages with more complex causes and solutions fall within the remit of authorised technical personnel.

Fault conditions may transpire that require the machine to be switched off completely and isolated from the electricity supply.

The machine must then be restarted as outlined in the section on switching the machine on in this chapter.

4.9. EJECTION AND ARRANGEMENT OF SOCKS PRODUCED BY THE MACHINE

The socks produced by the machine are ejected through the sock ejection hood and collected in a special bag attached to the ring located under the sock ejection hood.

All hosiery items expelled by the machine must be collected and sorted in suitable containers provided by the supervisor and handled with care, so they are not damaged when they reach the next processing stage.

4.10. WASTE MATERIALS PRODUCED BY THE MACHINE

The only waste materials produced by the machine are scraps of yarn resulting from hosiery cutting operations.

These scraps of yarn are transferred inside a special suction filter provided with the machine if the customer fits the required extraction fan or requests it.

If the customer has a central extraction system the yarn scrap extraction pipes must be connected to it.

Occasionally waste materials may include fragments of unfinished hosiery items resulting from processing tests or operations and these are usually expelled by the hosiery expulsion section and not extracted by the system.

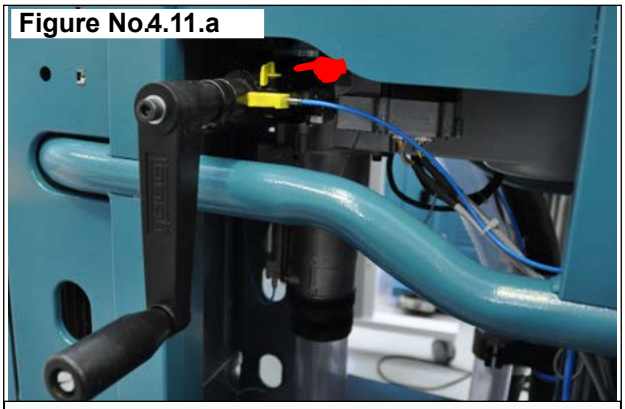
Attention: If the Lonati extraction filter provided with the fan is fitted, it must be emptied regularly as outlined in the Standard Maintenance chapter in the section on emptying the scrap yarn extraction filter. If a central system is used it must also be emptied, but less frequently and in accordance with the manufacturer's instructions.

4.11. CRANK UNIT

The device illustrated below is designed to block accidental engagement of the Crank, and intervenes automatically by stopping the machine immediately and displaying the error on the machine.

This device must not be tampered with or removed.

Figure No.4.11.a



Crank safety device

Figure No.4.11.b

Crank error message

5 STANDARD MAINTENANCE

LONATI cannot be held liable for risks to the safety of personnel or damage to the machine caused by failing to comply with instructions in this chapter and chapter 1.

5.1. ROUTINE CHECKS AND MAINTENANCE

The machine requires regular checks and maintenance as outlined in the routine checks and maintenance table so it continues to operate efficiently and does not get damaged.

Checks must be implemented in accordance with the time frequencies outlined in the table in consecutive order.

Note: The frequencies outlined in the routine checks and maintenance table relate to continual machine operation 24 hours a day 5 days a week.

If the machine is operated more than 5 days a week the frequencies indicated, over a day, must be decreased accordingly. If the machine is not used for fairly lengthy periods of time, the frequencies indicated must be increased accordingly.

Attention: If even just one check is missed it is strictly prohibited to use the machine, and the operator must notify the supervisor immediately and wait for safe machine conditions to be restored by authorised technical personnel.

Operators are only authorised to restore safe machine conditions in the cases specified in the routine checks and maintenance table where restoration details are outlined.

TABLE OF ROUTINE CHECKS AND MAINTENANCE			
MACHINE PART	**CHECK TO BE IMPLEMENTED**	**ACTION TO BE TAKEN**	**FREQUENCY**
Electrical cabinet	Check the electrical cabinet is not open at the start of each shift.	Switch the machine off completely as outlined in the Use chapter in the section on switching the machine off, then report it to a supervisor and wait for qualified technical personnel with the key to close it.	Daily

TABLE OF ROUTINE CHECKS AND MAINTENANCE			
MACHINE PART	**CHECK TO BE IMPLEMENTED**	**ACTION TO BE TAKEN**	**FREQUENCY**
Red EMERGENCY button on the control panel	Check it operates in accordance with the description in the user interface manual at the start of each shift.	Switch the machine off completely as outlined in the Use chapter in the section on switching the machine off, and unplug the power supply cable from the mains socket. Report the issue to a supervisor and wait for qualified technical personnel to restore safe machine conditions, then switch the machine on again as outlined in the section on switching the machine on.	Daily
STOP button on the control panel	Check it operates in accordance with the description in the user interface manual at the start of each shift.	Switch the machine off completely as outlined in the Use chapter in the section on switching the machine off, and unplug the power supply cable from the mains socket. Report the issue to a supervisor and wait for qualified technical personnel to restore safe machine conditions, then switch the machine on again as outlined in the section on switching the machine on.	Daily

TABLE OF ROUTINE CHECKS AND MAINTENANCE			
MACHINE PART	**CHECK TO BE IMPLEMENTED**	**ACTION TO BE TAKEN**	**FREQUENCY**
START button on the control panel	Check it operates in accordance with the description in the user interface manual at the start of each shift.	Switch the machine off completely as outlined in the Use chapter in the section on switching the machine off, and unplug the power supply cable from the mains socket. Report the issue to a supervisor and wait for qualified technical personnel to restore safe machine conditions, then switch the machine on again as outlined in the section on switching the machine on.	Daily
All the mobile and fixed guards on the machine	Check the guards are secured and positioned correctly at the start of each shift.	If any of the guards is not secured correctly switch the machine off completely as outlined in the Use chapter in the section on switching the machine off, unplug the power supply cable from the mains socket, then secure the guard/guards correctly.	Daily
General electrical parts	At the start of each shift check that there are no electrical parts exposed, damaged or not working, especially wires, cables, sheaths, contacts etc.	Switch the machine off completely as outlined in the Use chapter in the section on switching the machine off, and unplug the power supply cable from the mains socket. Report the issue to a supervisor and wait for qualified technical personnel to restore safe machine conditions, then switch the machine on again as outlined in the section on switching the machine on.	Daily

TABLE OF ROUTINE CHECKS AND MAINTENANCE			
MACHINE PART	**CHECK TO BE IMPLEMENTED**	**ACTION TO BE TAKEN**	**FREQUENCY**
Machine protection and safety devices (guards, sensors, electronic stops, etc.)	Before carrying out operations on the machine always ensure that its safety features are present and operating correctly and have not been disturbed.	Switch the machine off completely as outlined in the Use chapter in the section on switching the machine off, and unplug the power supply cable from the mains socket. Report the issue to a supervisor and wait for qualified technical personnel to restore safe machine conditions, then switch the machine on again as outlined in the section on switching the machine on.	Daily
All machine areas, especially read sensors and proximity switches	At the start of each shift check for deposited yarn residue.	Switch the machine off completely as outlined in the Use chapter in the section on switching the machine off, and unplug the power supply cable from the mains socket. Using a suitable extractor remove any dust, yarn scraps and any other substances deposited carefully, to reduce the risk of fire. After carrying out this maintenance operation the machine can be switched on again as outlined in the Use chapter in the section on switching the machine on.	Daily
Moving machine parts	When the machine is operating, regularly check that yarn scraps do not wrap round moving parts and hamper correct operation.	Switch the machine off completely as outlined in the Use chapter in the section on switching the machine off, unplug the power supply cable from the mains socket and remove the scraps of yarn hampering operation. After carrying out this maintenance operation the machine can be switched on again as outlined in the section on switching the machine on in this chapter.	Daily

TABLE OF ROUTINE CHECKS AND MAINTENANCE			
MACHINE PART	**CHECK TO BE IMPLEMENTED**	**ACTION TO BE TAKEN**	**FREQUENCY**
Machine ventilation grilles and vents Grids protecting the cooling fans inside the control cabinet or at various points of the machine	At the start of each shift check the machine ventilation grilles and vents and cooling fans are not obstructed by dust, yarn residue or other substances, in order to prevent malfunctioning.	Switch the machine off completely as outlined in the Use chapter in the section on switching the machine off, and unplug the power supply cable from the mains socket. Using a suitable extractor remove any dust, yarn scraps and any other substances deposited carefully, to reduce the risk of fire. After carrying out this maintenance operation the machine can be switched on again as outlined in the Use chapter in the section on switching the machine on.	Daily
All areas of the machine	At the start of each shift check that no work tools or instruments have been left inside or on top of the machine, to prevent these objects from falling among moving parts and damaging the machine or jeopardising personal/collective safety.	If one or more work tools is left inside or on top of the machine, switch it off completely as outlined in the Use chapter in the section on switching the machine off and unplug the power supply cable from the mains socket. After removing anything left behind switch the machine on again as outlined in the section on switching the machine on in this chapter.	Daily
All areas of the machine	At the start and at the end of each work shift, check that on or in the machine there are no deposits of shavings or fragments of any kind, fragments, residues resulting from the breakage of textile accessories or other material, in order to avoid any malfunctions or damage to the machine.	Switch the machine off completely as outlined in the Use chapter in the section on switching the machine off, and unplug the power supply cable from the mains socket. Report the issue to a supervisor and wait for qualified technical personnel to restore safe machine conditions, then switch the machine on again as outlined in the section on switching the machine on.	Daily

TABLE OF ROUTINE CHECKS AND MAINTENANCE			
MACHINE PART	**CHECK TO BE IMPLEMENTED**	**ACTION TO BE TAKEN**	**FREQUENCY**
Suction filter or yarn cuttings (mounted on request only)	During operation, check that the suction filter for yarn cuttings is not filled up.	Empty the suction filter completely as outlined in the Standard Maintenance chapter, under the “Emptying the yarn length suction filter” subsection.	Daily or several times a day, according to the type of article being processed
Pressure regulator filter	During operation, check that the level of water condensate in the pressure regulator filter is not close to the upper limit	Drain the water condensate out of the pressure regulator filter as outlined in the Standard Maintenance chapter, under subsection “Draining the pressure regulator filter”	Every 168 worked hours (based on daily 24-hour shifts)
All areas of the machine	Check the state of cleaning of all internal and external parts of the machine	Thoroughly remove any oil deposits, yarn noils, grease smudges, accumulated dust and other substances, as outlined in the Standard Maintenance chapter, under subsection “Periodic cleaning of the machine”	Every 336 worked hours (based on daily 24-hour shifts)
Lubrication pump	During operation, check that the oil level in the lubrication pump tank is not located close to the minimum level.	Top up with oil as outlined in the Standard Maintenance chapter under subsection “Maintenance: topping up the lubrication pump with oil”	Every 48 worked hours (based on daily 24-hour shifts)
Lubrication pump	First start-up of the pump Replacing the filter	Pump maintenance as outlined in the Standard Maintenance chapter under paragraph “Maintenance: cleaning the lubrication circuit on machine first start-up and replacing the oil return filter”	1st filter change after 2016 worked hours (=12 weeks) Further changes every 4032 worked hours (=24 worked weeks)

TABLE OF ROUTINE CHECKS AND MAINTENANCE			
MACHINE PART	**CHECK TO BE IMPLEMENTED**	**ACTION TO BE TAKEN**	**FREQUENCY**
Dial sinker plate	Dismantling for checking the state of greasing	Manual greasing as outlined in the Standard Maintenance chapter under the subsection on “Machine greasing points”	Every 720 worked hours
Drive pin of the dial sinker plate and bearing slot of the drive flange	Dismantling for checking the state of greasing	Manual greasing as outlined in the Standard Maintenance chapter under the subsection on “Machine greasing points”	Every 2160 worked hours
Mobile yarn finger plate (only for machine with motorised vertical shaft)	During operation, visually check that the centring pins are properly lubricated	Manual greasing of the centring pins, as described in the chapter entitled “Basic maintenance”, under subsection "Machine greasing points"	Every 1344 worked hours
Cylinder-raising motor	Dismantling the machine to check the greasing state of the worm screw	Manual greasing as outlined in the Standard Maintenance chapter under the subsection on “Machine greasing points”	Every 720 worked hours
Welt raiser motor (only for machine in the motorised vertical shaft version)	Checking the worm screw greasing state	Manual greasing as outlined in the Standard Maintenance chapter under the subsection on “Machine greasing points”	Every 720 worked hours
All flat parts, such as dial jacks, needles, sinkers, selector jacks and sinker jacks	Wear and tear	Replacement	Every 8640 worked hours (=360 worked days)

5.2. PERIODIC CLEANING OF THE MACHINE

As described in the previous subsection on “Controls and periodical interventions”, the machine must be cleaned thoroughly at the intervals shown in the table, in order to ensure proper operation over time and prevent any malfunctions or damage to the machine, namely for the following reasons:

- Specific tests revealed that mixing oils and yarn residues form a highly flammable mixture, which is a potential hazard.
- Despite solutions adopted by Lonati at the design stage, in case of accidental short circuit or electric discharge, the presence of flammable material reduces the protection of the machine, and the machine must therefore be kept clean and tidy both outside and inside it, including the electrical cabinet.
- The machine, on areas of individual electric parts (fuses, wires, various contacts, boards, transformer and other devices), must always be free from any infiammable substance.

Attention: Remove any yarn residues on the electronic and electrical boards using a vacuum cleaner, not compressed air because dirt could be trapped in the gaps between the electrical and electronic components, thus increasing the potential fire hazard.

Always avoid operating the machine if it is not cleaned properly, especially in the presence of the oil and yarn residue mixture.

If this situation occurs, turn the machine off completely, as outlined in the “Operation” chapter, under the subsection on “Machine complete shutdown procedure”, also by disconnecting the power cord from the mains socket, then promptly report the problem to the supervisor, wait until called-in skilled, duly authorised technicians have removed the accumulated mixture; the machine can then be turned on again as described in this chapter under subsection “Machine start-up procedure”.

5.3. EASILY-SOLVABLE ERROR MESSAGES

Some error messages caused by machine failures and appearing on the machine display are easy to be fixed because their cause can be described in the message itself and the corresponding corrective action is automatically understandable, or if not , it can be found in the “Table of easily-solvable error messages” shown below.

TABLE OF EASILY-SOLVABLE ERROR MESSAGES		
ERROR MESSAGE	**POSSIBLE CAUSES**	**CORRECTIVE ACTION**
Suction hood open	Sock not fully ejected from the ejection hood and blocking the door	Remove the stuck sock
	Suction feeding tube disconnected	Reconnect the feeding tube
	Diaphragm of the suction hood stop in the wrong closed position	Check the wholeness of the diaphragm or the regulation of the unit to which it is fixed
	Rocker arm of the suction hood door not positioned properly	Adjust the position of the rocker arm at the closing gate of the sock ejection hood
Sock delivery failed	Sock still present but not yet released from the stitching needles	Check the needles for integrity
	Breakage of the sock detection photocell	Replace the photocell or check it is properly wired
Stop due to the breakage of jacks 1/2/etc. (depending on machine model)	Selection needle butt or electronic selection teeth broken	Replace the jack
Yarn take-up	Yarn breakage during work	Machine threading and check of the cause of breakage that could be due to: broken needle, broken sinker, yarn reel in wrong position
	Failed or wrong adjustment of the plate tensioner or recoil spring	Properly adjust the heel yarn take-up device
End of reel (mechanical top)	Error detected by the mechanical stop mounted on the sensor ring fixed to the solenoid valve box	Replace the empty reel or position the yarn reel correctly
Creel end reel (creel mechanical stop)	Error detected by the mechanical stop mounted on the creel	Replace the empty reel or position the yarn reel correctly

TABLE OF EASILY-SOLVABLE ERROR MESSAGES		
ERROR MESSAGE	**POSSIBLE CAUSES**	**CORRECTIVE ACTION**
Spyder yarn breakage error: (spyder number)	Yarn not detected by the Spyder sensor	Check for any yarn breakages
		Check planned threading in yarn fingers
		If the two previous situations are correct, adjust Spyder sensor sensitivity
Uncut yarn sensor: (sensor number)	Yarn flow in a situation inconsistent with the first sock learning cycle	Check yarn finger threading or adjust Spyder sensor sensitivity
Needle stop at butt point	Failed yarn take-up due to yarn finger obstruction	Clean the yarn finger in the obstructed flow area
Latches 1,2,3, etc.(depending on machine model)	Needel latch breakage	Replace the damaged needle
Elastic 1 stop	Elastic yarn breakage	Thread the machine by resetting the elastic feed sensor
Elastic 2 stop	Elastic yarn breakage	Thread the machine by resetting the elastic feed sensor
No air pressure	No air pressure or pressure drop in the machine circuit.	Make sure that the filter bush of the pressure regulator is in the open position
		Check the operation of the main compressed air supply system
Knife 1 cleaning stop	Blunt blade of thread knife or cutter	Replace the thread knife or cutter
Knife 2 cleaning stop (installed on certain models only)	Blunt blade of thread knife or cutter	Replace the thread knife or cutter
No oil	Low oil level in the lubrication pump tank	Top up with oil
Oil pressure check due to incorrect supply	No actual oil supply to machine (message displayed only with ILC progressive metering pump)	Check that the distribution tube(s) are not crushed along the circuit
		Bleeding
		Replacing the magnetic sensor on the pump

All the other failure messages involving more complex corrective action pertain to skilled and authorised technical personnel, which means that when these messages are displayed, it is mandatory to report the failure to the supervisor. It is strictly prohibited for machine operators to carry out any checks or repairs in connection with this type of messages.

5.4. EMPTYING THE SUCTION FILTER BY REMOVING ANY YARN SCRAPS

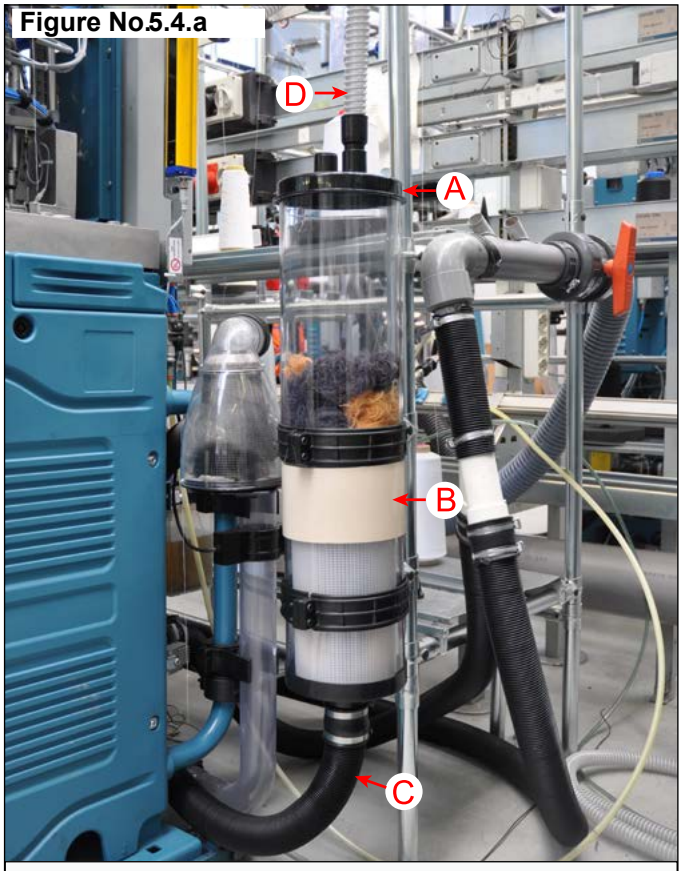
This filter can be mounted only when a suction fan is requested in the absence of a central suction system, or on request if the existing central system is not equipped with a centralized yarn collection system.

As shown in the “Periodical controls and maintenance table”, the time frequency for clearing the suction filters of any scraps of yarn depends on the type of article being knitted, and it can be at least once or several times a day to prevent filter clogging and consequent failure and incorrect suction.

Check that the filter is not full during operation; if so, empty the filter completely as follows:

Cleaning of the filter connected to the suction fan

Figure No.5.4.a



Overall view of the suction filter

Figure No.5.4.b

Empty the suction filter of any scraps of yarn

4) Select F3 on the machine display to bring the machine programme to end cycle.
5) With the machine at end cycle, select F1 in the display (chain stop).
6) With the machine in this condition, the suction fan connected to the tube (C) is stopped.
7) Manually remove the top filter cover (A) only and extract all scraps of yarn.
8) Remount the cover (A), making sure that the connection of the tube (D) from the hood is properly inserted, and the guard (B) is in an upper position and covers the gaps.
9) Resume normal working.

Cleaning of the filter connected to the centralised suction system

Figure No.5.4.c

Overall view of the suction filter

Figure No.5.4.d

Empty the suction filter of any scraps of yarn

10) Select F3 on the machine display to bring the machine programme to end cycle.

11) Move the guard (B) downwards until the two bottom gaps housing the filter are exposed; in this way, suction from the tube (C) to the centralised system decreases inside the filter.

12) Remove the top cover (B) of the filter and extract all scraps of yarn.

13) Replace the cover (A), making sure the connection of tube (D) from the hood is properly fitted; then move the guard (B) back to the upper position to cover the gaps and resume suction.

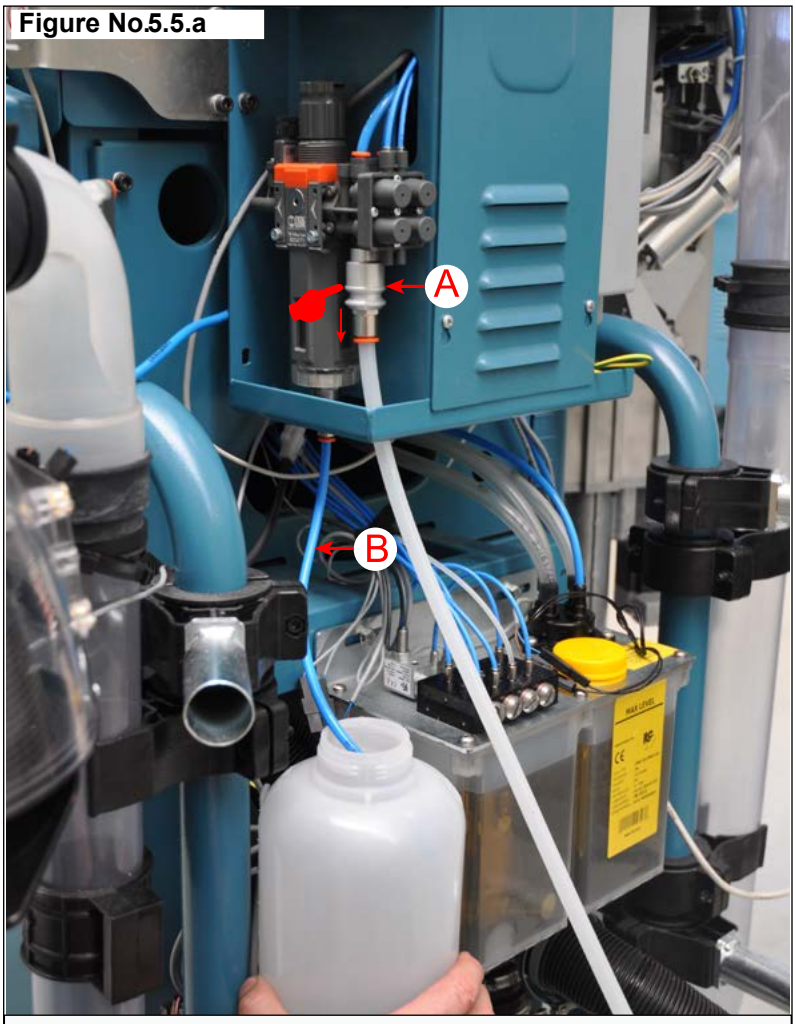
14) Resume normal working.

5.5. RELIEVING THE PRESSURE REGULATOR FILTER

As shown in the “Periodical controls and maintenance table”, the condensate from the compressed air pressure regulator filter must be drained at least every 168 worked hours, in order to avoid clogging of the filter and the consequent failure and incorrect pressure in the machine compressed air system.

Check that during operation the level of condensation water in the pressure regulator filter has not reached the maximum level, otherwise drain it out as follows:

Figure No.5.5.a



Draining the pressure regulator filter

1) Select F3 in the machine display to stop the machine automatically at end cycle.
2) Insert an 8mm diameter pipe (B) into the fitting on the pressure regulator tank; get a container to collect any condensate from the pipe.
3) Turn off compressed air supply to the machine, by lowering the bush (A) of the pressure regulator (with this operation the condensate is also drained out).
4) When the condensate has been drained out, move the bush (A) back upwards to resume compressed air supply.
5) The “No air pressure” error will be displayed; select F8 to clear the error message and resume work by deselecting F3.

Figure No.5.5.b

Error: No air pressure

5.6. ILC PROGRESSIVE OIL METERING PUMP

IMPORTANT!
The technical, maintenance and installation information regarding the pump contained in this chapter are included in the use and maintenance manual provided and attached by the manufacturer, to which reference must be made for all safety rules and regulations.

For a more complete documentation, such information has been complemented to the operation manual of the machine with which the pump is combined.

The ILC pneumatic pump model PRA-15 was designed specifically to lubricate needles and cylinders on textile knitting machine.

When combined in this special configuration with progressive oil metering, this pump ensures actual control of the lubrication cycle and exceptional rapidity in work times because the lubricant is supplied immediately and there is not decompression phase for meter resetting.

The pump control unit consists of a cylinder in which a piston with an NBR gasket slides, a spring ensure the return of the piston to the starting position.

The control solenoid valve must be 3 ways, NC (Normally Closed).

5.6.1. TECHNICAL CHARACTERISTICS OF THE CONTROL PUMP

ILC LUBRICATION PUMP	
Technical characteristics of the control pump	
Flow rate	1cc/cycle
Air control pressure	4-7 bar
Ratio	8.5÷1
Protection class	
Max. operating temperature	-20°C + 60°C
Tank capacity	3 litres
Suction filter	150 micron
Filter full	250 micron
Minimum power level	Contact open in the presence of lubricant 1.5A - 250V AC - 150V DC
Connection	Male insulated Faston 6.3, cable projection 50 mm
Return filter	Paper+metallic+magnet 10 micron
Approved lubricants	Oil density 15:1000cSt

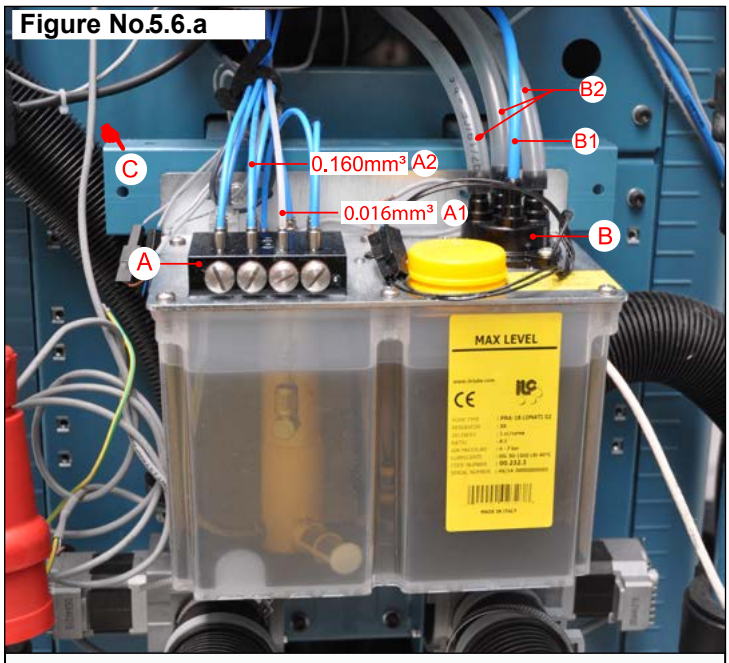
5.6.2. TECHNICAL CHARACTERISTICS OF THE PROGRESSIVE METER

ILC LUBRICATION PUMP	
Technical characteristics of the progressive meter	
Flow rate	6 doses, 0.160mm³- blue pipe 1 dose, 0.016mm³ - white pipe
Air control pressure	4-7 bar
Ratio	8.5÷1
Protection class for sensor	
Max. operating temperature	-20°C + 60°C
Number of outputs	7
Connections	pipe Ø 3.17mm
Control sensor	Inductive
Electrical data	NPN NO voltage 10-30V DC outut max 200mA
Connection	Connector AMP MODU II 4 poles 280629 + contacts "M" AMP Modu II 86561-9 cable 100mm

5.6.3. INSTALLATION OF THE PUMP AND PNEUMATIC AND HYDRAULIC CONNETIONS OF THE LUBRICANT CIRCUIT

Install the pump behind the machine by fixing it only to the dedicated bar (C); installation in other areas of the machine or other unsuitable types of fixing or pneumatic and electrical connections that are modified or altered are not permitted and Lonati disclaims all civil and criminal liabilities for improper use of the pump.

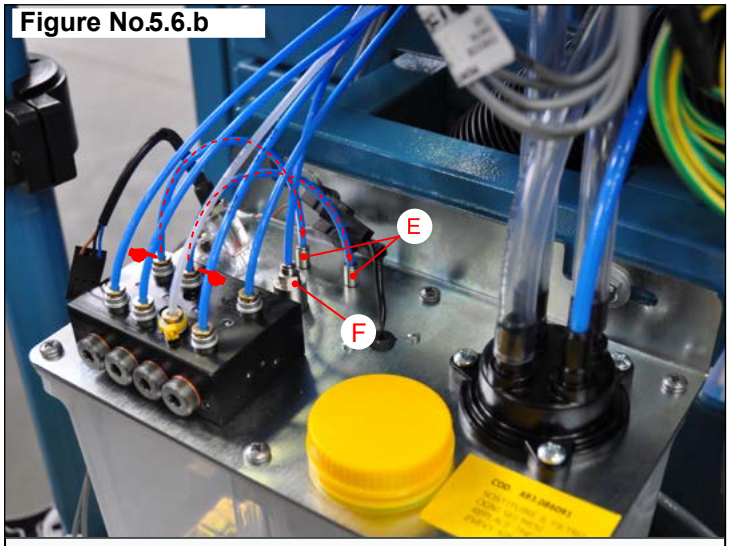
Figure No.5.6.a



Hydraulic connections

- A= 7-output progressive meter.
- A1= Hydraulic connection with a white tube, 1 meter only, supplies 0.016mm³, only for the lubrication of the worm screw of the motorized vertical shaft.
- A2= Hydraulic connection with a blue tube, a total of 6 metering points, supply 0.160mm³, for overall lubrication.
- B= 4-way plug for the return filter.
- B1= Oil recovery from the fitting below the cylinder support of the base.
- B2= Oil recovery in general, type of base, etc.)

Figure No.5.6.b



Reconnect the free outputs to clean oil recovery fittings

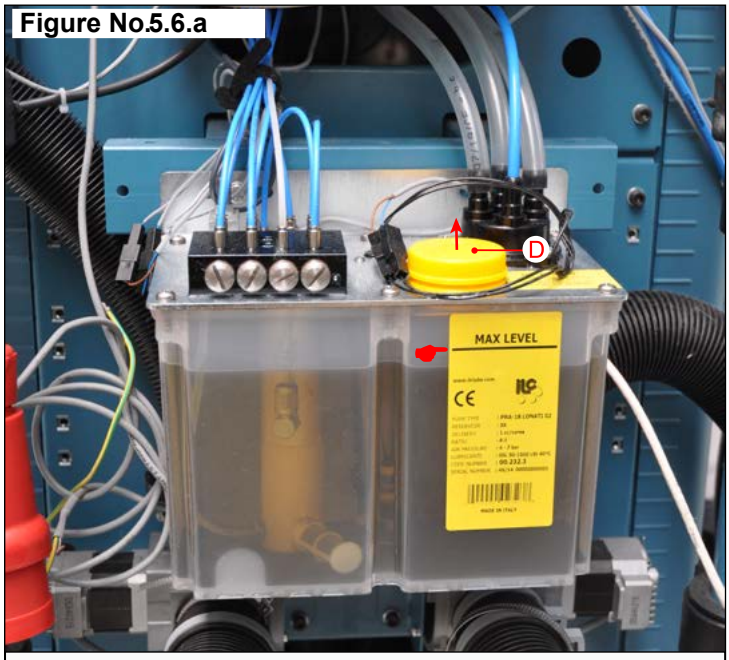
- E= Clean oil recovery fittings.
- F= Pump compressed air supply inlet.

IMPORTANT!
Any unused fittings of the progressive meter (A) must be reconnected with a tube to the clean oil recovery fittings (E).

5.6.4. MAINTENANCE: TOPPING UP THE LUBRICATION PUMP WITH OIL

As shown in subsection “Periodical controls and interventions” and the associated table in this chapter, check that during operation the oil level in the lubrication pump tank has not reached the bottom of the main filter (visible from outside) and, before the machine stops automatically and the “Easily-solvable error message” appears on the screen, top up with the oil grade made available by the supervisor, as follows:

Figure No.5.6.a



Maintain the maximum level

1) Without stopping the machine, unscrew the filling cap (D) and top up with oil up to the maximum level notch on the tank (do not remove the filter during this operation).
2) Close the cap (D).
3) Use the recommended oil grades only; wear gloves and goggles, as envisaged in the lubricant safety data sheet.

Top up with oil every 48 worked hours

5.6.5. MAINTENANCE: PRESSURE VALUE OF THE COMPRESSED AIR SYSTEM

The pressure must be maintained at 6.5 Bar.

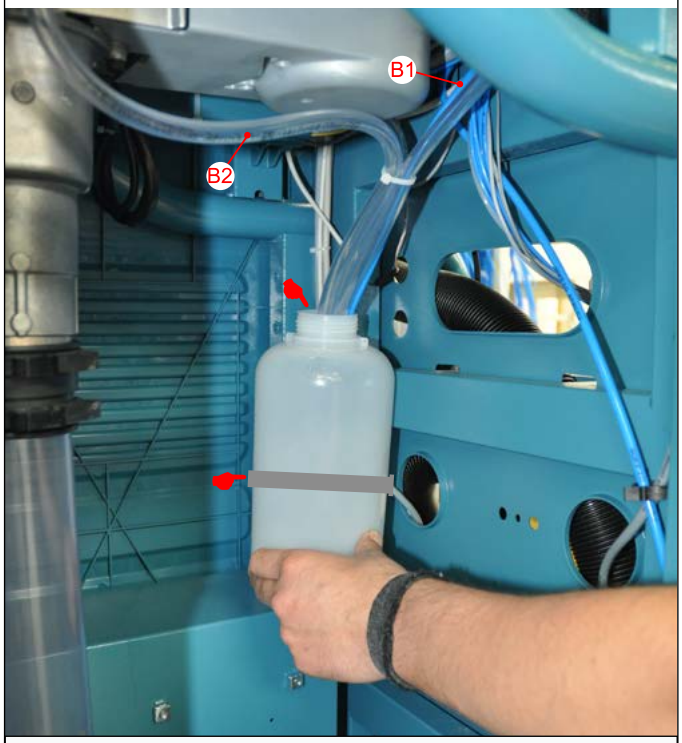
5.6.6. MAINTENANCE: CLEANING THE LUBRICATION CIRCUIT ON MACHINE FIRST START-UP AND REPLACING THE OIL RETURN FILTER

As shown in subsection “Periodical controls and interventions” and the associated table in this chapter, the oil return filter must be replaced only after the machine has been running 673 worked hours (4 weeks), without recovering the oil in the pump, but collecting it separately as specified below.

After this period, replace the return filter at the prescribed frequency shown under the subsection entitled “Replacing the oil return filter”.

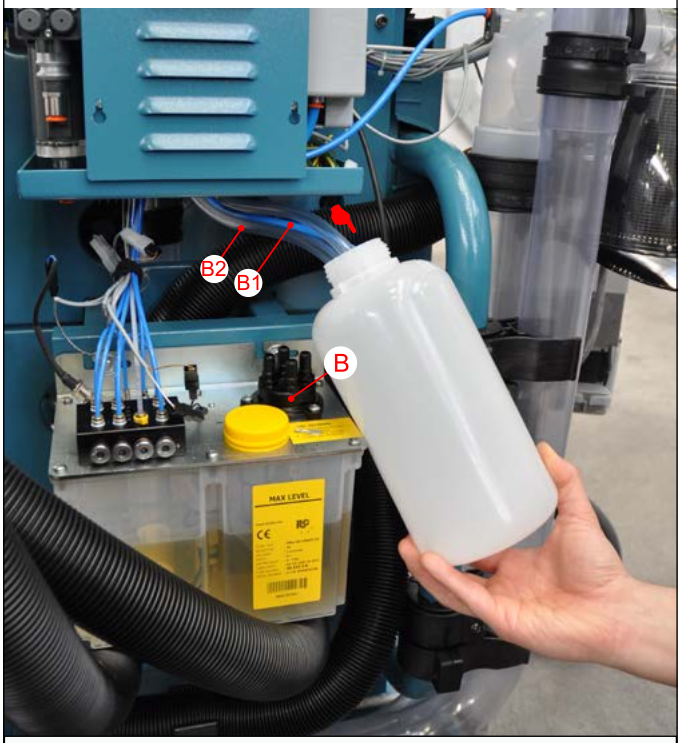
Cleaning the lubrication circuit on machine first start-up

Figure No.5.6.a



Solution suggested

Figure No.5.6.b



Solution to be avoided

Solution suggested:

1) Disconnect the oil recovery pipes (B1) and (B2), reposition them inside the base and insert them in a container with a capacity of at least 3 litres, which must be fixed to the base with a strap and secured in position so as to prevent it from tipping over and getting in contact with electrical components or scraps of yarn.
2) After 673 worked hours (4 weeks), reconnect the oil recovery pipes to the 4-way cap (B) and normally operate the pump.

Solution to be avoided:

3) Avoid collecting the oil recovery pipes (B1) and (B2) and placing them in a container to be positioned outside the machine base, even if it is fixed and secured safely to prevent it from tipping over and getting in contact with electrical components or scraps of yarn.

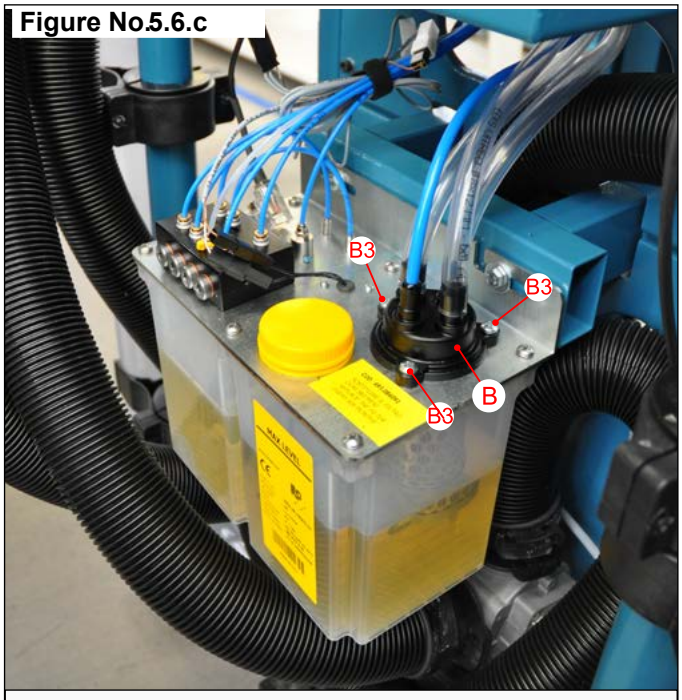
Replacing the oil return filter

After completing the “Cleaning the lubrication circuit on machine first stat-up” procedure at the set intervals, proceed as follows to replace the oil return filter:

1st filter replacement after 2016 worked hours (equal to 12 worked weeks) since the first recycling connection.

The every 4032 worked hours (equal to 24 worked weeks).

Figure No.5.6.c



Replacing the filter

1) Turn off the machine completely as described in chapter “Use” under subsection “Procedure for complete machine shutdown”.
2) Unscrew the screws (B3).
3) Pull out the 4-way cap (B).
4) Pull out and replace the oil return filter with one of the same type, making reference to the Lonati spare parts catalogue.

5.6.7. MAINTENANCE: REMOVING AIR FROM THE PUMP (BLEEDING)

As outlined in the Standard Maintenance chapter under subsection “Easily-soluble error messages” and related table, the “Incorrect oil pressure control adjustment” error message is attributable to actual failed supply of lubricant to the machine.

The presence of air in the circuit can cause problems to operation of the system and generate false cycle alarms.

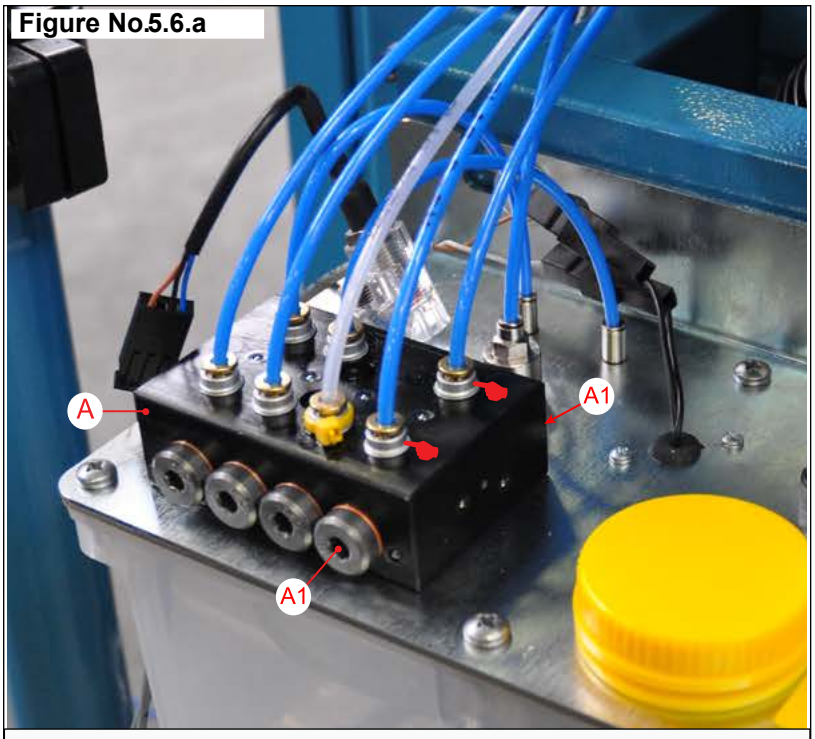
This problem may sometimes occur when starting up a system, especially the failure to top up oil when it was at the minimum level.

Proceed as follows to remove air from the circuit:

1) select F3 on the machine display to automatically stop the machine at end cycle.
2) Follow the path shown in the displayed table until reaching [E] – multiple Exits.

Select:	Go to:
SPACE	Management Menu
D	Main Menu
A	Autotest
A	Outputs
E	Various outputs

Figure No.5.6.a



Operate the piston caps (A1) of the meter unit (A)

3) Selecting Multiple Exits gives access to various functions from which you can select “Function 3 Oil Pump”.
4) Select repeatedly until there are no traces of air in the lubricant coming out of the distributor.
5) If the problem persists, slightly unscrew the 2 piston caps (A1) by 1/3 of a turn at the 2 final outputs of the meter supporting unit (A).
6) Operate the pump via “Function 3 – oil pump” until air comes out and the control microswitch resumes constant reading.

5.6.8. MAINTENANCE: CHECKING THE CORRECT SUPPLY OF OIL AT THE MACHINE LUBRICATION POINTS

As outlined in the Standard Maintenance chapter under subsection “Easily-soluble error messages” and related table, the “Incorrect oil pressure control adjustment” error message is attributable to actual failed supply of lubricant to the machine.

Check that the distribution tubes from the pump to the lubrication fitting have not been crushed.

Proceed as follows:

1) select F3 on the machine display to automatically stop the machine at end cycle.
2) Follow the path shown in the displayed table until reaching [E] – multiple Exits.

Select:	Go to:
SPACE	Management Menu
D	Main Menu
A	Autotest
A	Outputs
E	Various outputs

3) Remove the blue tube from the quick-fit coupling at the machine lubrication point.
4) Selecting Multiple Outputs gives access to various functions from which you can select “Function 3 Oil Pump” to operate the pump and check whether there is any lubricant leak.
5) Repeat the check on all machine lubrication points.
6) If the circuit leaks, replace the nozzle on the machine.

5.7. REPLACING SELECTOR JACKS AND PATTERN JACKS

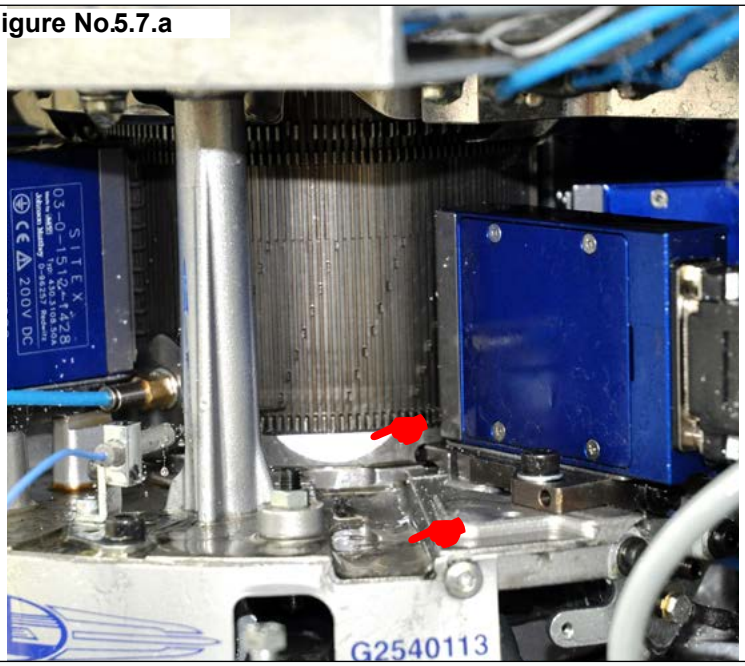
The selector jacks and pattern jacks must be extracted and inserted from the bottom plate, where the jack selection ring is located, using a dedicated zone.

The extraction sequence involves the selector jack first followed by the pattern jack.

The insertion sequence involves the pattern jack first followed by the selector jack.

Turn off the machine completely as described in chapter “Use” under subsection “Procedure for complete machine shutdown” only if it is necessary, e.g. for maintenance purposes or when mechanical component parts must be removed.

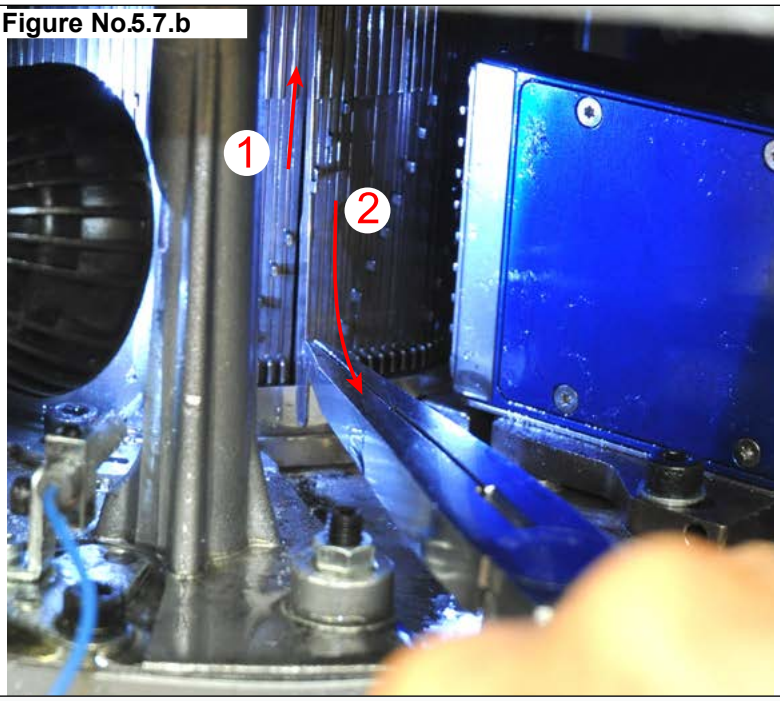
Figure No.5.7.a



Selector jack and pattern jack extraction zone

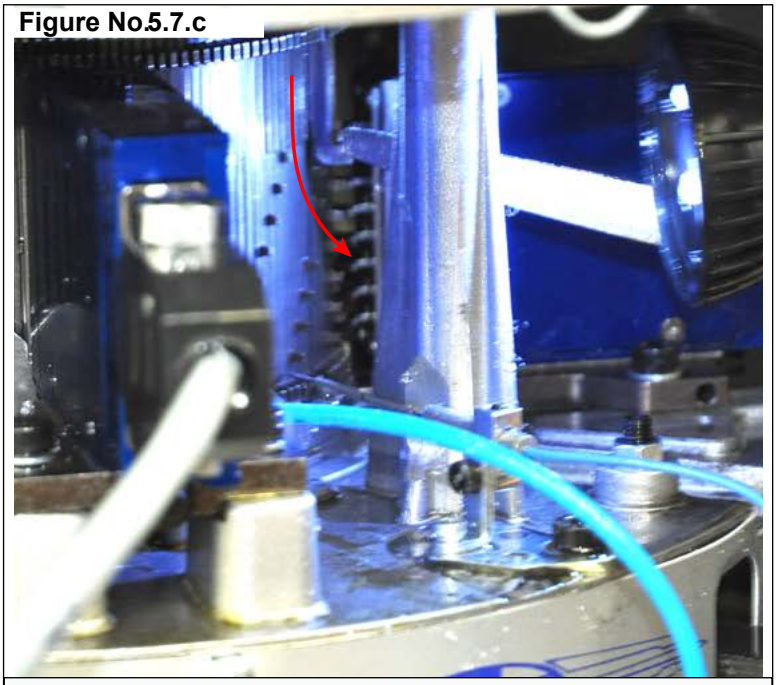
1) Following a machine shutdown due to the breakage of the butt of selector or pattern jacks, or simply for replacement purposes, press the emergency stop button to make the machine safe, remove the guard on the crank side that protects the cylinder zone of the bottom dial, and proceed as follows:
2) Rotate the cylinder manually using the mechanical crank and move the selector jack or pattern jack to the extraction zone.
3) Use the trappers provided to hold the lower butt of the selector jack and push it 5-6 mm upwards so that the bottom part projects from the mesh ring.
4) Extract and lower it in sequence until it is fully extracted.

Figure No.5.7.b



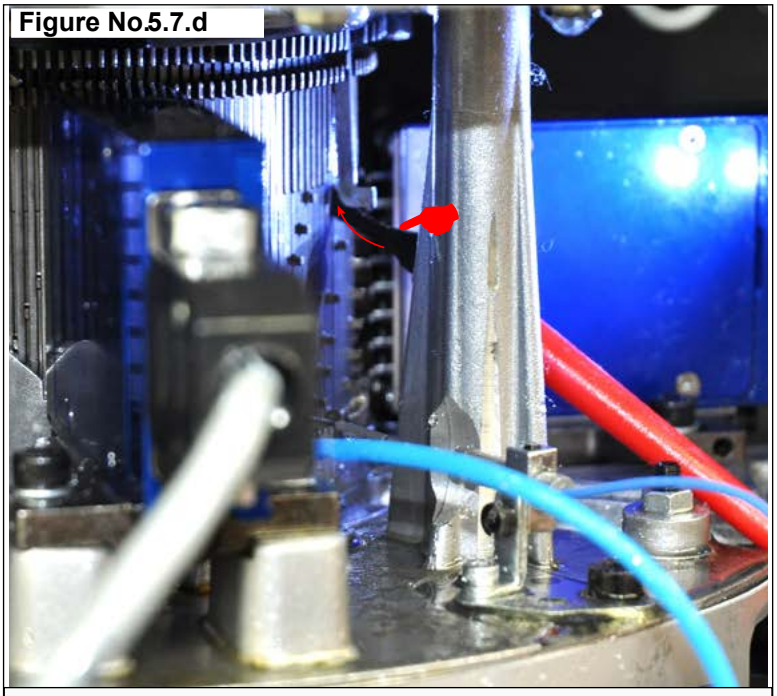
Extracting selector jacks

Figure No.5.7.c



Extracting the pattern jack

Figure No.5.7.d



Extraction of the pattern jack using a tool

5) Use the trapper provided to extract the pattern jack; hold the butt and lower and extract it in sequence.

6) If the selection tooth of the pattern jack is broken, use a half-moon tool to extract it from its slot in the cylinder.

7) Follow the same procedure used for the extraction in reverse and insert the pattern jack first and the selector jack.

8) Remount the guards removed previously, eliminate the error generated by the emergency button and resume the work cycle, or alternatively restart the machine as described in the chapter “Use” under “Machine start-up procedure”.

Attention: If one or more teeth of the selector jack are broken, extract the selector jack involved and clear the area of any residues left in and outside the cylinder slot and replace the selector jack. This avoids damaging the machine when it is restarted and, more importantly, causing a safety risk to operators owing to the projection of splinters.

5.8. REPLACING THE NEEDLES

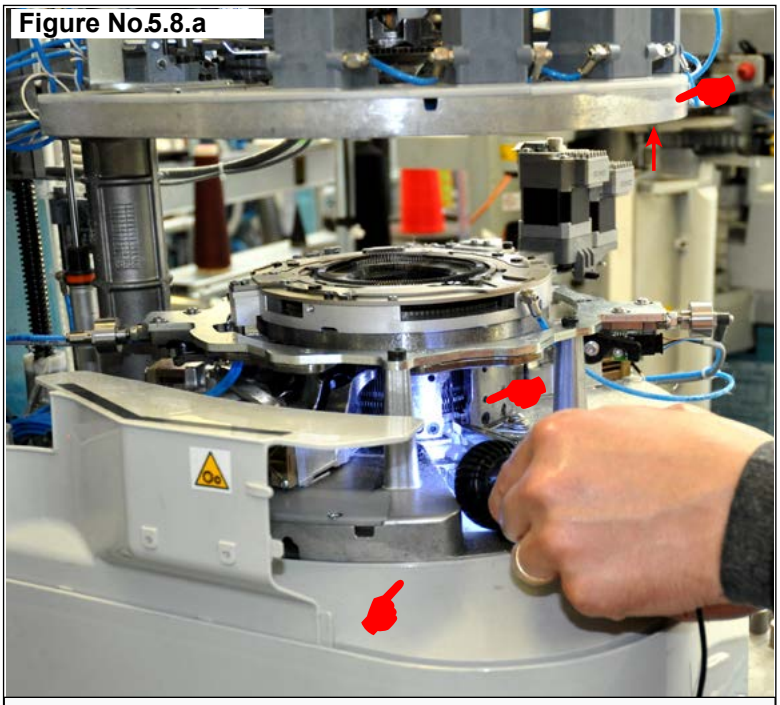
The needles must extracted and inserted from the intermediate dial, where the selector jack ring is located, using a dedicated zone.

For machines with motorised vertical shaft: set the machine to operation by moving the yarn finger plate to its highest position.

For machines with pneumatic vertical shaft: no pre-setting, continue as specified below, the pictures refer to a model with a motorised vertical shaft, but the replacement does not entail any difference.

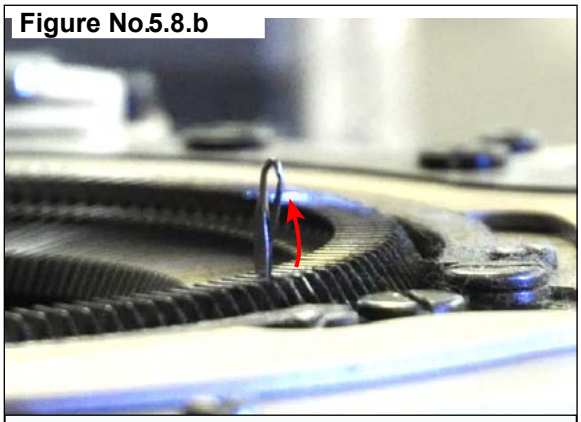
Turn off the machine completely as described in chapter “Use” under subsection “Procedure for complete machine shutdown” only if it is necessary, e.g. for maintenance purposes or when mechanical component parts must be removed.

Figure No.5.8.a



View of the needle ejection zone (machine with motorised vertical shaft)

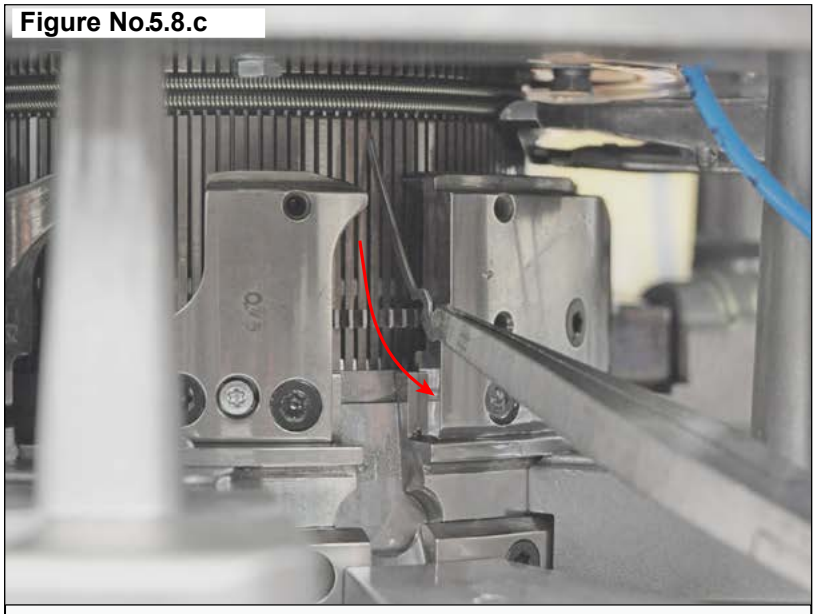
Figure No.5.8.b



Close the needle latch for extraction and open it for insertion

1) Following a machine stop due to the breakage of needle butts or latches, or simply for replacement purposes, press the emergency stop button to make the machine safe; remove all the front guards protecting the cylinder zone of the upper dial and replace the needles as follows:
2) Manually rotate the cylinder using the mechanical crank until the needle reaches the extraction area in the unloaded zone of the yarn finger plate at a level with the upper unloading zone present on the jack counter-ring.
3) Close the needle latch manually to prevent it from getting trapped in the cylinder retaining springs during extraction.

Figure No.5.8.c



Needle extraction.

4) Use the trapper provided to hold the butt of the needle and lower and extract it in sequence from the cylinder.

5) Extract and lower it in sequence until it is fully extracted.

6) The needle must be inserted following the procedure for extraction in reverse, taking care to open the latch completely to prevent it from getting trapped in the cylinder retaining springs.

7) Remount the guards removed previously, eliminate the error generated by the emergency button and resume the work cycle, or alternatively restart the machine as described in the chapter “Use” under “Machine start-up procedure”.

Attention: If a needle is broken, extract it and clear the area of any residues left in and outside the cylinder slot before replacing it. This avoids damaging the machine when it is restarted and, more importantly, causing a safety risk to operators owing to the projection of splinters.

5.9. REPLACING THE SINKERS

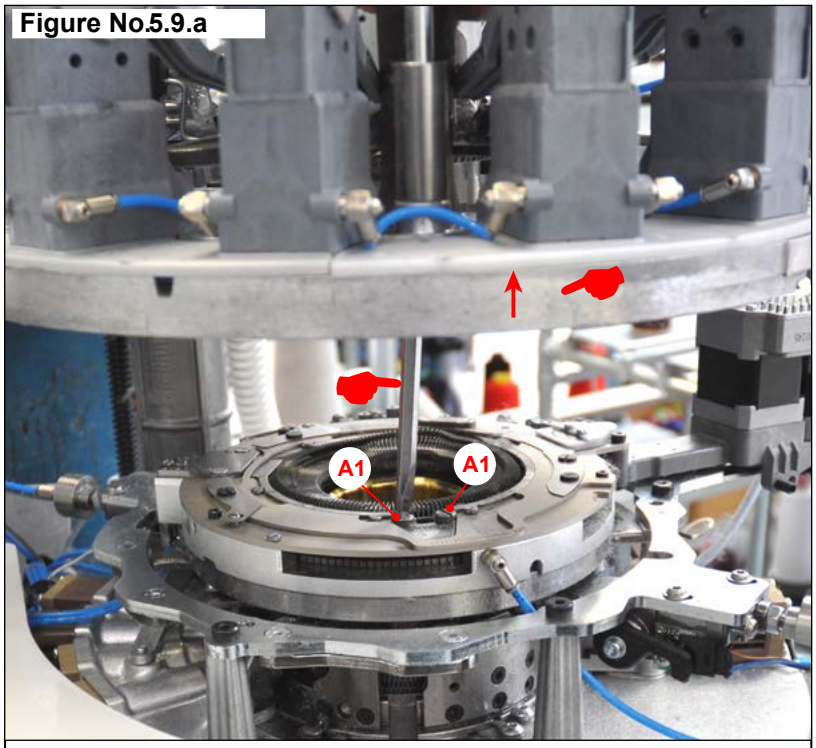
The sinkers must be extracted and inserted from the wedge on the sinker cam cap.

For machines with motorised vertical shaft: set the machine to operation by moving the yarn finger plate to its highest position.

For machines with a pneumatic vertical shaft: if the sinker extraction slot is obstructed by yarn fingers, it is advisable to remove the yarn finger unit to facilitate sinker extraction.

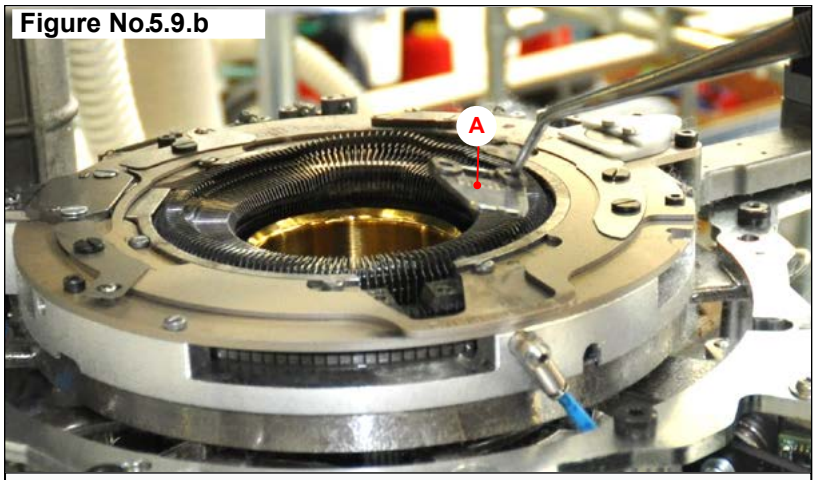
Turn off the machine completely as described in chapter “Use” under subsection “Procedure for complete machine shutdown” only if it is necessary, e.g. for maintenance purposes or when mechanical component parts must be removed.

Figure No.5.9.a



Raise the yarn finger plate to access the sinker extraction zone

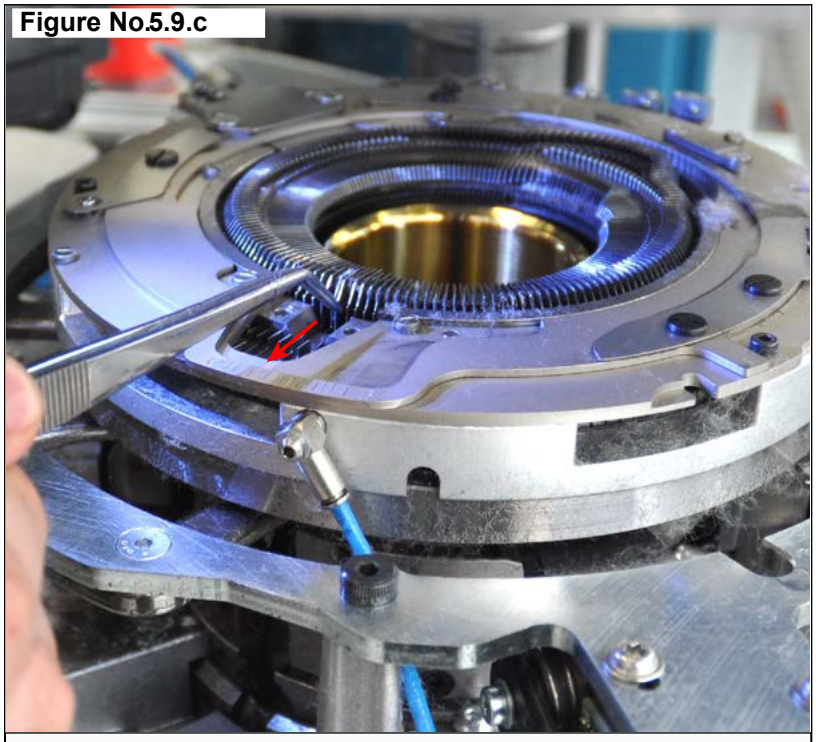
Figure No.5.9.b



Remove the extraction wedge

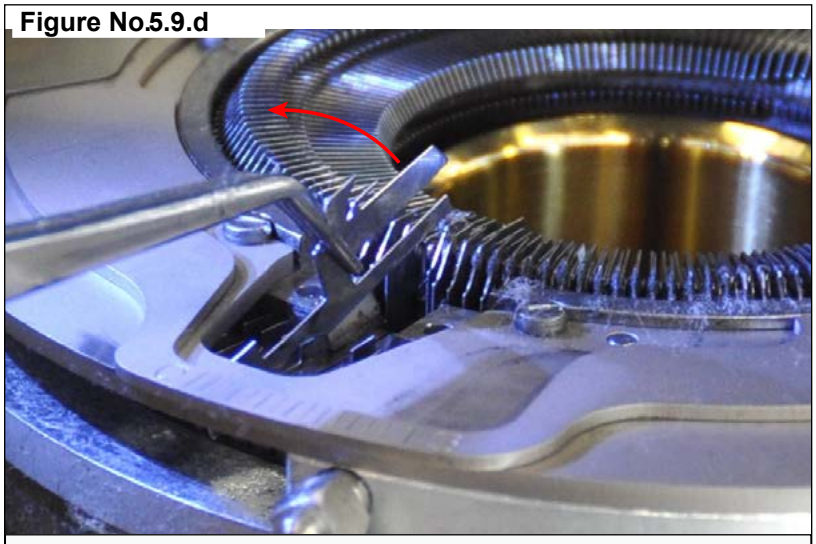
1) Following a machine shutdown due to the breakage of a sinker, or simply for replacement purposes, press the emergency stop button to make the machine safe, and proceed as follows:
2) Unscrew the screws (A1).
3) Remove the sinker extraction wedge (A) from the sinker cam cap.
4) Rotate the cylinder by operating the mechanical crank manually until the sinker is moved to centre of the extraction zone free from the wedge (A).

Figure No.5.9.c



Retract the sinker

Figure No.5.9.d



Extract the sinker

5) Use the grippers provided to hold the sinker and retract extract it from the guide in sequence.

6) The sinker must be inserted following the procedure for extraction in reverse, taking care to position the siker butt behind the path selection cams.

7) Remount the wedge (A) and the screws (A1) and slowly move the cylinder by hand to bring the removed sinkers on the cam path.

8) Clear the error caused by the EMERGENCY button and resume the operating cyle, or restart them machine as outlined in the Use chapter, under the Switching-on Machine Procedure subsection.

Attention: If a sinker gets broken, extract it and clear the area of any residues left in the slot inside and outside the crown and then replace it. This avoids damaging the machine when it is restarted and, more importantly, causing a safety risk to operators owing to the projection of splinters.

5.10. REPLACING DIAL JACKS

The replacement of dial jacks requires the dismantling of the dial and the related cutter.

For machines with motorised vertical shaft: set the machine to operation by moving the yarn finger plate to its highest position.

For machines with a pneumatic vertical shaft: manually release the welt horizontal unit by moving it to the highest position to facilitate its removal.

Switch the machine off completely, as outlined in the Use chapter in the section on switching the machine off, only if it is necessary, e.g. maintenance or removal of mechanical parts, otherwise proceed as follows:

1) Select F3 on the machine display to automatically stop the machine at end cycle.

2) Follow the path displayed in the table as far as Multiple Exits (E) is reached.

Select:	Go to:
SPACE	Management Menu
D	Main Menu
A	Autotest
A	Outputs
E	Various outputs

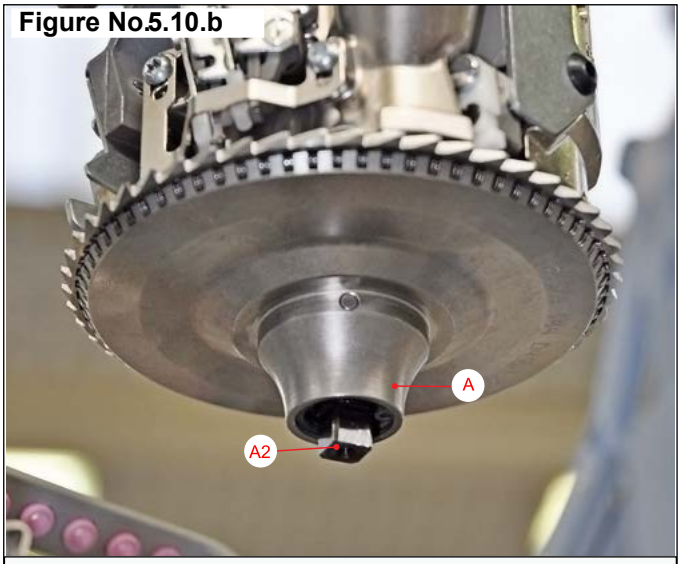
3) Multiple Exits gives acces to various functions; hence select the Cutter Release function.

4) Using an hexagonal socket wrench, unscrew the screw fixing the protective cover (A1) and remove it.

Figure No.5.10.a

Machine with motorised vertical shaft: unscrew the screw (A2)

Figure No.5.10.b

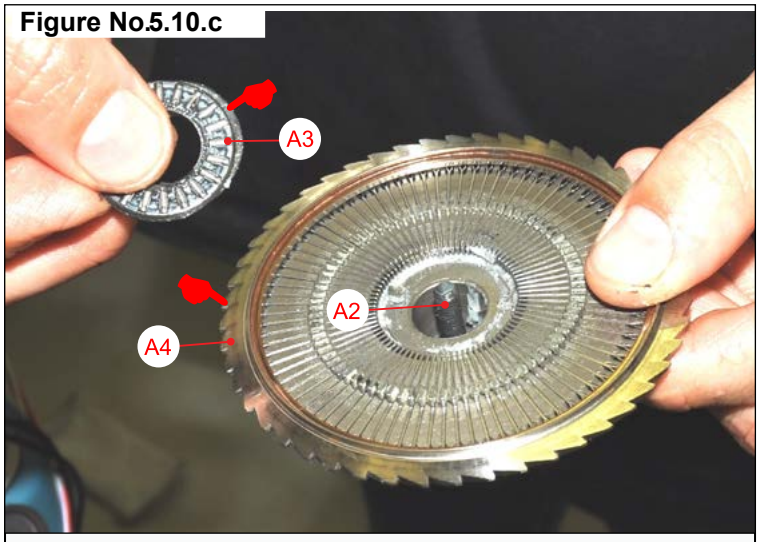


Machine with pneumatic vertical shaft: unscrew the screw (A2)

5) Unscrew the screw (A2) securing the jack dial (A) to the cutter transmission shaft.

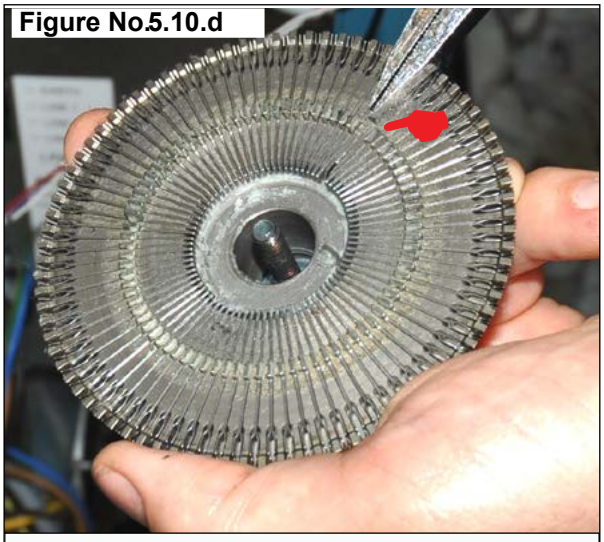
6) Take hold of the dial when releasing it, without worrying about the screw (A2), which is held in position by the internal retainer.

Figure No.5.10.c



Remove the radial bearing (A3) and the cutter (A4)

Figure No.5.10.d



Replacing the dial jacks

7) Remove the radial bearing (A3), taking care of any shims underneath, which must be repositioned when reassembling.

8) Remove the cutter and replace the dial jacks.

Attention: If one or more teeth of the dial jack have broken off, extract the dial jack involved and clear the area of any residues left in and outside the slot in the dial or jack cam dial before reassembling. This avoids damaging the machine when it is restarted and, more importantly, causing a safety risk to operators owing to the projection of splinters.

5.11. MACHINE GREASING POINTS

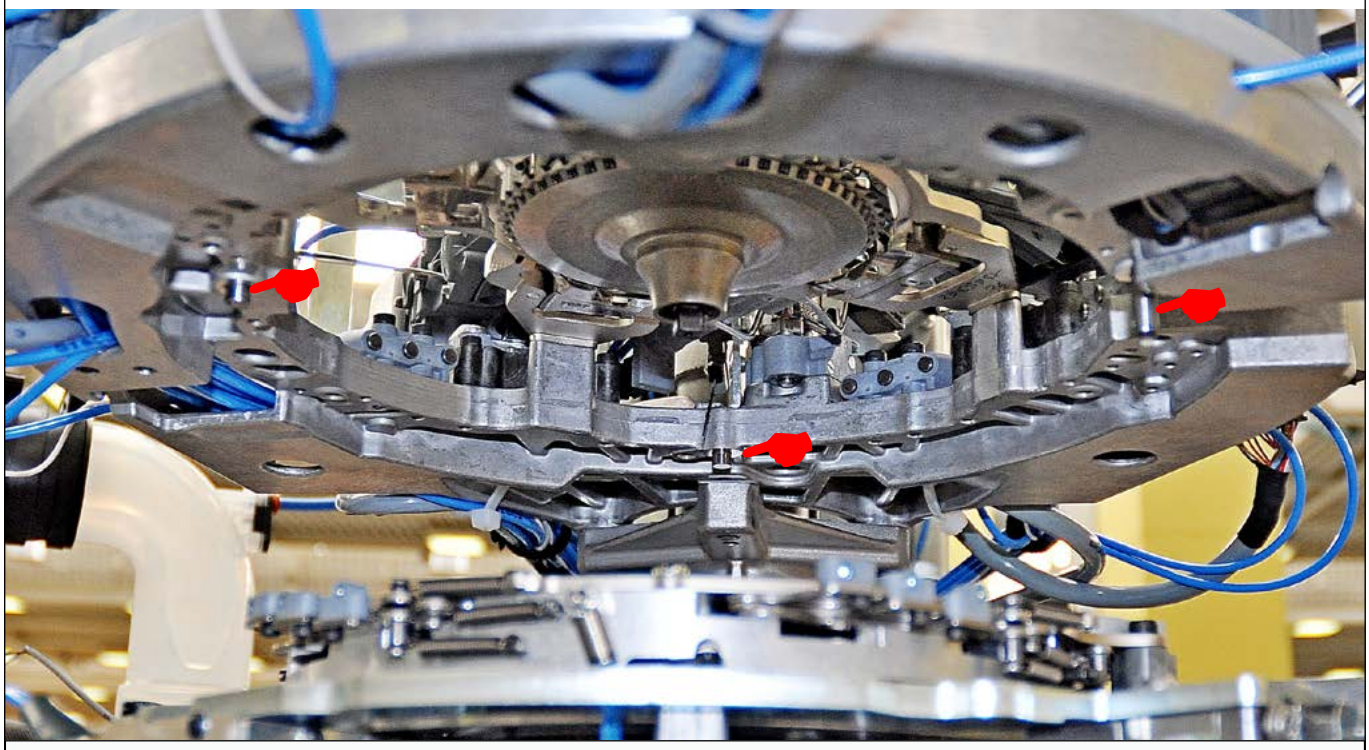
The machine is completely lubricated at LONATI factory prior to its shipment.

Some parts of the machine, such as the jack dial and the worm screws of the various motors, need to be lubricated periodically in order to maintain correct operation of the machine over time and prevent it from any malfunctions or damages.

Lubrication must be done using the lubricants recommended by LONATI in the chapter entitled “Technical characteristics, dimensions and consumption” under subsection “Recommended lubricants”.

Manually grease the following points every 1344 worked hours (equal to 2 working months), using a brush:

Figure No.5.11.a



Only for machines with motorised vertical shaft: IMPORTANT! Thoroughly clean the centring pins of yarn finger plate before lubrication

Manually grease the following points every 720 worked hours (equal to 1 working month), using a brush:

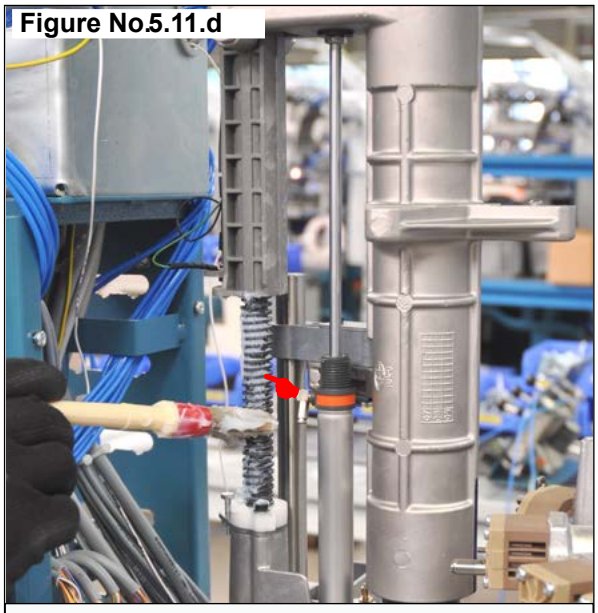
Figure No.5.11.b

Motorized vertical shaft: the grooved part of the vertical drive shaft

Figure No.5.11.c

Pneumatic vertical shaft: the grooved part of the vertical drive shaft

Figure No.5.11.d



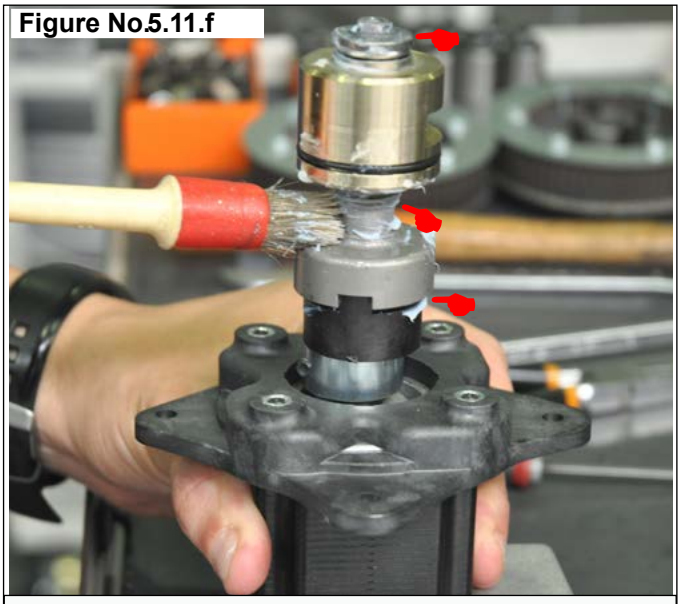
Only for machine with motorised vertical shaft: the worm screw of the welt riser motor

Figure No.5.11.e

The dial sinkers and the radial bearing

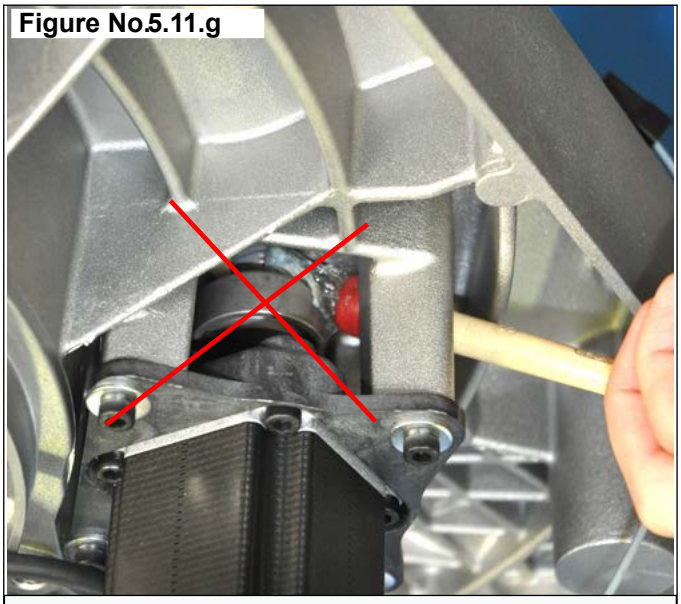
Manually grease the following points every 720 worked hours (equal to 1 working month), using a brush:

Figure No.5.11.f



The worm screw and the point joining the two mechanical couplings

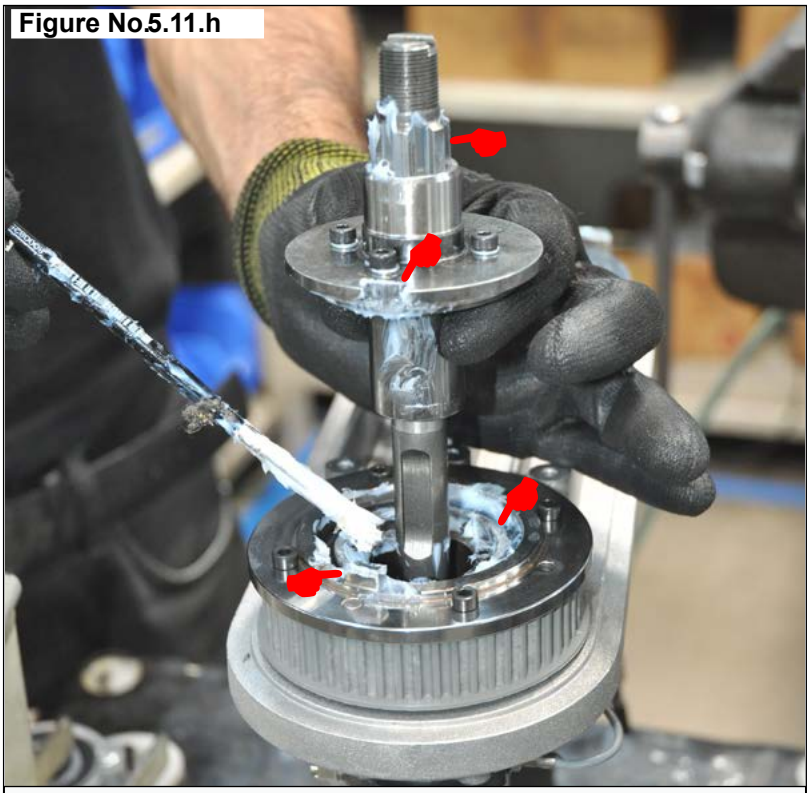
Figure No.5.11.g



Avoid greasing without dismounting the cylinder raising motor

Manually grease the cutter dragging pin every 2160 worked hours (equal to 3 working months), using a brush.

Figure No.5.11.h



All the points indicated

6 TECHNICAL CHARACTERISTICS - DIMENSIONS AND CONSUMPTION

This chapter contains a description of the following technical characteristics by type of machine, depending on the models covered by this manual, including:

- Technical characteristics common to machines series GKS/0-GKD
- Technical characteristics for machines: GK516S/0-GK615S/0-GK616S/0-GK715S/0-GK716S/0.
- Technical characteristics for machines series GK516D-GK616D.
- Technical characteristics for machines series GK525S/0-GK625S/0-GK725S/0.
- Technical characteristics for machines series GK544S/0.
- The dimensions and weights of the machine and shipping packing.
- Consumption of electricity, compressed air and lubricants.

6.1. TECHNICAL CHARACTERISTICS COMMON TO MACHINES SERIES GKS/0-GKD

The control and execution of all machine commands rely on latest-generation electronics, equipped with high-resolution touch-screen display.

Patterns and articles are created and processed using the Digraph 3 Plus software that contains a library of styles that the operator can combined in different ways in order to obtain the desired result.

Machine movement via a coaxial brushless motor with cylinder holder.

New-concept base designed to increase strength and stability; it also allows a more ergonomic assembly of the various components.

Textile head designed to make superior quality items and ensure constant reliable operation over time.

Reciprocated heel and toe in different sizes.

Electronically-controlled actuators for needle selection.

6.2. TECHNICAL CHARACTERISTICS FOR MACHINES: GK516S/0-GK615S/0-GK616S/0-GK715S/0-GK716S/0

One-feed single-cylinder machine for the production of stockins and pantyhose, with the possibility of creating multi-colour patterns and heel in reciprocating motion.

Integral electronic programming of sock cycle, style and mesh adjustment.

Machine can store several styles, with 8 sizes per style.

follows the table of Technical Characteristics, divided by machine model:

TABLE OF TECHNICAL CHARACTERISTICS	
DESCRIPTION	**MODELS GK615S/0-GK715S/0 (5 colours)** **MODELS GK516/S0-GK616S/0-GK716S/0 (6 colours)**
Cylinder diameters:	4": GK516S/0 3"-3/4: GK615S/0-GK616S/0 3"-1/2: GK715S/0-GK716S/0
Gauge of needles available:	0.85 mm-0.70 mm-0.60 mm
Number of colours per course:	5/6 colours per course depending on model + background
Number of feeds:	1 background-1 for elastic-5/6 for colours
Number of yarn fingers per feeder or feed:	Feeder 1: 9 yarn fingers with 2 pneumatically controller work positions Colour feed: 2 or 3 yarn fingers per feed Elastic feeder: 1 standard yarn finger with optional second yarn finger
Stitch formation units:	Feed 1, pneumatic version with 1- or 2-position vertical dipping: supplied standard for Terry machine; on request for Plain Knit machine Heel return feed, pneumatic version Motorized versions available on request
Needle cam units:	Pneumatic two-stage entry and exit command with position control
Type of needle selection	Electronic needle-needle
Number of actuators with electronic needle-needle selection:	9 actuators for machines with 6 colour feeders 8 actuators for machines with 5 colour feeders
Heel yarn takeup device	Standard version with 4 yarn takeup devices Version with 6 yarn takeup devices on request
Terry sinker caps	Motorised, available on request with 1 or 2 motors to vary pressure and/or angle position
Sinker caps, plain knit	High speed, available on request with 1 or 2 motors to vary pressure and/or angle position
Vertical unit for moving cutter and yarn finger plate	Motorised only for machines: GK516/S0-GK616S/0-GK716S/0
Cutter movement vertical shaft unit	Pneumatic only for machines: GK615S/0-GK715S/0
Cutter with mechanical safety stop device	Cutter with a variable number of teeth on request Cutter with mechanical stop Variable speed via stepper motor on request

6.2.1. BASIC TABLE OF YARNS THAT CAN BE PROCESSED DEPENDING ON MACHINE GAUGE

Cylinder diameter	Needle thickness	Needle gauge	Machine gauges	Number of needles	yarns that can be used and recommended counts		
					Acrylic (Nm)	Cotton (Ne)	Nylon (Decitex)
3"1/2 GK715S/0 GK716S/0	0.85 mm	24	6½-7½-8-8½-9	72-84-88-96-100	1/26	10/1-12/1	70/2
			10	108-112	1/26-1/32	10/1-12/1	70/2
			10½-11-11½	116-120-128	1/32	12/1-14/1	70/2
	0.70 mm	36	6½-7½-8-8½-9	72-84-88-96-100	1/32	16/1-20/1	44/2-70/2
			10	108-112	1/40	16/1-20/1	44/2-70/2
			10½-11-11½-12	116-120-128-132	1/40	16/1-20/1	44/2-70/2
			13-14	144-156	1/40	20/1	44/2-70/1
			15	168	1/50	24/1-30/1	44/2-70/1
	0.60 mm	48	16½-17½-18	180-192-200	1/50	30/1-60/2	44/2-70/1
			20	220	1/50	40/1-80/2	44/2-70/1
3"3/4 GK615S/0 GK616S/0	0.85 mm	24	7-7½-8-9-9½	84-88-96-108-112	1/26	10/1-12/1	70/2
			10-10½-11	116-120-128-132	1/26-1/32	10/1-12/1	70/2
	0.70 mm	36	7-7½-8-9-9½	84-88-96-108-112	1/40	16/1-20/1	44/2-70/2
			10-10½-11	116-120-128-132	1/40	16/1-20/1	44/2-70/2
			12-13-13½-14-15	144-156-160-168-176	1/40	24/1-30/1	44/2-70/1
	0.60 mm	48	15½-16-16½-17-18-18½	180-188-192-200-216-220	1/50	30/1-60/2	44/2-70/1
			21	240	1/50	40/1-80/2	44/2-70/1
4" GK516S/0	0.85 mm	24	6½-7-7½-8½-9	84-88-96-108-112	1/26	10/1-12/1	70/2
			9½-10-10½	116-120-128-132-136	1/26-1/32	10/1-12/1	70/2
	0.70 mm	36	6½-7-7½-8½-9	84-88-96-108-112	1/40	16/1-20/1	44/2-70/2
			9½-10½-11-11½-12½	116-120-128-132-136-144-156-160	1/40	16/1-20/2	44/2-70/2
			13½-14	168-176	1/40	24/1-30/2	44/2-70/1
	0.60 mm	48	14½-15-15½-16-17-17½	180-188-192-200-216-220	1/50	30/1-60/2	44/2-70/1
			19	240	1/50	40/1-80/2	44/2-70/1

6.2.2. PERFORMANCE ADMITTED

Maximum speed when processing plain knit 350 rpm.

Maximum speed when processing terry 300 rpm.

Heel and toe 300 dippings/minute (reciprocating motion)

Note: Maximum speed may vary depending on yarn, knitting, lubrication etc.

The figures shown above may require suitable reduction, to be determined according to specific functional tests, when certain types of yarn are used and/or styles with specific types of knitting are made.

6.2.3. PRODUCTION CHARACTERISTICS (TYPES OF POSSIBLE MESH)

5- or 6- colour pattern per course, according to model, plus background, filet, tuck and floating option.

In areas with warp-knitted elastic, 5- or 6- colour pattern per course, according to model, plus background, tuck and floating option.

In areas with woven elastic, filet, tuck and floating option with 4- or 5-colour pattern per course, according to model, plus background.

6.3. TECHNICAL CHARACTERISTICS FOR MACHINES: GK516D-GK616D

Monocylinder 1-feed machine for the production of socks, with possible 6-colour patterns per course, in patterned terry or plain knit, heel and toe terry selection in reciprocating motion.

Integral electronic programming of sock cycle, style and mesh adjustment.

Machine can store several styles, with 8 sizes per style.

follows the table of Technical Characteristics, divided by machine model:

TABLE OF TECHNICAL CHARACTERISTICS	
DESCRIPTION	**MODELS GK516D-GK616D (6 colours)**
Cylinder diameters:	4": GK516D 3"-3/4: GK616D
Gauge of needles available:	0.85 mm-0.70 mm-0.60 mm
Number of colours per course:	6 colours per cours plus background
Number of feeds:	1 background-1 for elastic-6 for colours
Number of yarn fingers per feeder or feed:	Feeder 1: 9 yarn fingers with 2 pneumatically controller work positions Colour feeder: 3 yarn fingers per feed Elastic feeder: 1 standard yarn finger with optional second yarn finger
Stitch formation units:	1-feed pneumatic version with 1 or 2 position vertical offset Motorized versions available on request
Needle cam units:	Pneumatic two-stage entry and exit command with position control
Type of needle selection	Electronic needle-needle
Number of actuators with electronic needle-needle selection:	9 actuators for needle selection 1 actuator for sinker selection
Heel yarn takeup device	Standard version with 4 yarn takeup devices Version with 6 yarn takeup devices on request
Terry sinker caps	Motorised with 2 motors to vary the pressure and/or angle position
Sinker caps, plain knit	High speed, motorised with 2 motors to vary pressure and/or angle position
Vertical unit for moving cutter and yarn finger plate	Motorised
Cutter with mechanical safety stop device	Cutter with a variable number of teeth on request | Cutter with a mechanical stop Variable speed via stepper motor on request

6.3.1. BASIC TABLE OF YARNS THAT CAN BE PROCESSED DEPENDING ON MACHINE GAUGE

Cylinder diameter	Needle thickness	Needle gauge	Machine gauges	Number of needles	yarns that can be used and recommended counts		
					Acrylic (Nm)	Cotton (Ne)	Nylon (Decitex)
4" GK516D	0.85 mm	24	6½-7-7½-8½	84-88-96-108-112	1/26	10/1-12/1	70/2
			9½-10½-11-11½	116-120-128-132-136-144	1/26-1/32	10/1-12/1	70/2
	0.70 mm	36	6½-7-7½-8½	84-88-96-108-112	1/40	16/1-20/1	44/2-70/2
			9½-10½	116-120-128-132	1/40	16/1-20/1	44/2-70/2
			11-11½-12½	136-144-156-160	1/40	16/1-20/1	44/2-70/1
			13½-14	168-176	1/40	24/1-30/1	44/2-70/1
	0.60 mm	48	14½-15-15½-16	180-188-192-200	1/50	30/1-60/2	44/2-70/1
3"3/4 GK616D	0.85 mm	24	7-7½-8-9-9½	84-88-96-108-112	1/26	10/1-12/1	70/2
			10-10½-11-12	116-120-128-132-144	1/26-1/32	10/1-12/1	70/2
	0.70 mm	36	7-7½-8-9-9½	84-88-96-108-112	1/40	16/1-20/1	44/2-70/2
			10-10½-11-12	116-120-128-132-144	1/40	16/1-20/1	44/2-70/2
			13-13½-14-15	156-160-168-176	1/40	24/1-30/1	44/2-70/1
	0.60 mm	48	15½-16-16½-17	180-188-192-200	1/50	30/1-60/2	44/2-70/1

6.3.2. PERFORMANCE ADMITTED

Maximum speed when processing plain knit, without pattern, 250 rpm.

Maximum speed when processing patterned terry 250 rpm.

Heel and toe 250 dippings/minute (reciprocating motion)

Note: Maximum speed may vary depending on yarn, knitting, lubrication etc.

The figures shown above may require suitable reduction, to be determined according to specific functional tests, when certain types of yarn are used and/or styles with specific types of knitting are made.

6.3.3. PRODUCTION CHARACTERISTICS (TYPES OF POSSIBLE MESH)

6-colour pattern per course plus background, filet, tuck and floated in plain knit or patterned plaited terry.

In areas with warp-knitted elastic, 6-colour pattern per course, plus background, tuck and 1-feed floated, in plain knit or patterned plaited terry.

In areas with warp-knitted elastic, filet, tuck and floated with 5-colour pattern per course, plus 1-feed background, in plain knit or patterned plaited terry.

6.4. TECHNICAL CHARACTERISTICS FOR MACHINES: GK525S/0-GK625S/0-GK725S/0

Single-cylinder 2-feed machine for the production of socks and pantyhose in terry and plain knit with multi-colour patterns, heel and toe in reciprocating motion.

Integral electronic programming of sock cycle, style and mesh adjustment.

Machine can store several styles, with 8 sizes per style.

follows the table of Technical Characteristics, divided by machine model:

TABLE OF TECHNICAL CHARACTERISTICS	
DESCRIPTION	**MODELS GK525S/0-GK625S/0-GK725S/0 (5 colours)**
Cylinder diameters:	4": GK525S/0 3"-3/4: GK625S/0 3"-1/2: GK725S/0
Gauge of needles available:	0.85 mm-0.70 mm-0.60 mm
Number of colours per course:	5 colours per course + plus 1-feed background
Number of feeds:	1 background-1 for elastic-1 for second feed-5 for colours
Number of yarn fingers per feeder or feed:	Feeder 1: 9 yarn fingers with 2 pneumatically controller work positions Feeder 2: 6 pneumatically controlled yarn fingers, Colour feeder: 3 pneumatically controlled yarn fingers per feed Elastic feeder: 1 standard yarn finger with optional second yarn finger
Stitch formation units:	Feed 1, pneumatic version with 1- or 2-position vertical dipping: supplied standard for Terry machine; on request for Plain Knit machine Heel return feed, pneumatic version Motorized versions available on request
Needle cam units:	Pneumatic two-stage entry and exit command with position control
Type of needle selection	Electronic needle-needle
Number of actuators with electronic needle-needle selection:	9 actuators
Heel yarn takeup device	Standard version with 4 yarn takeup devices Version with 6 yarn takeup devices on request
Terry sinker caps	Motorised with 2 motors to vary the pressure and/or angle position
Sinker caps, plain knit	High speed, available on request with 1 or 2 motors to vary pressure and/or angle position
Vertical unit for moving cutter and yarn finger plate	Motorised
Cutter with mechanical safety stop device	Cutter with a variable number of teeth on request Cutter with mechanical stop Variable speed via stepper motor on request

6.4.1. BASIC TABLE OF YARNS THAT CAN BE PROCESSED DEPENDING ON MACHINE GAUGE

Cylinder diameter	Needle thickness	Needle gauge	Machine gauges	Number of needles	yarns that can be used and recommended counts		
					Acrylic (Nm)	Cotton (Ne)	Nylon (Decitex)
3"1/2 GK725S/0	0.85 mm	24	7½-8-8½-9	84-88-96-100	1/26	10/1-12/1	70/2
			10	108-112	1/26-1/32	10/1-12/1	70/2
			10½-11	116-120	1/32	12/1-14/1	70/2
	0.70 mm	36	7½-8-8½-9	84-88-96-100	1/32	16/1-20/1	44/2-70/2
			10-10½-11-11½-12	108-112-116-120-128-132	1/40	16/1-20/1	44/2-70/2
			13-14	144-156	1/40	20/1	44/2-70/2
			15	168	1/50	24/1-30/1	44/2-70/1
	0.60 mm	48	16½-17½-18	180-192-200	1/50	30/1-60/2	44/2-70/1
			20	220	1/50	40/1-80/2	44/2-70/1
3"3/4 GK625S/0	0.85 mm	24	7-7½-8-9-9½	84-88-96-108-112	1/26	10/1-12/1	70/2
			10-10½-11	116-120-128-132	1/26-1/32	10/1-12/1	70/2
			12	144	1/40	16/1-20/1	44/2-70/2
	0.70 mm	36	7-7½-8-9-9½	84-88-96-108-112	1/40	16/1-20/1	44/2-70/2
			10-10½-11	116-120-128-132	1/40	16/1-20/1	44/2-70/2
			12-13-13½-14-15	144-156-160-168-176	1/40	24/1-30/1	44/2-70/1
	0.60 mm	48	15½-16-16½	180-188-192	1/50	30/1-60/2	44/2-70/1
			17-18½	200-216-220	1/50	30/1-60/2	44/2-70/1
			20	240	1/50	40/1-80/2	44/2-70/1
4" GK525S/0	0.85 mm	24	6½-7-7½-8½	84-88-96-108-112	1/26	10/1-12/1	70/2
			9½-10½-11-11½	116-120-128-132-136-144	1/26-1/32	10/1-12/1	70/2
	0.70 mm	36	6½-7-7½-8½	84-88-96-108-112	1/40	16/1-20/2	44/2-70/2
			9½-10½	116-120-128-132	1/40	16/1-20/2	44/2-70/2
			11-11½-12½-13½-14	136-144-156-160-168-176	1/40	24/1-30/2	44/2-70/1
	0.60 mm	48	14½-15-15½-16-17-17½	180-188-192-200-216-220	1/50	30/1-60/2	44/2-70/1
			19-20	240-256	1/50	40/1-80/2	44/2-70/1

6.4.2. PERFORMANCE ADMITTED

Maximum speed in plain knit, without pattern, 350 rpm.

Maximum speed when processing terry 300 rpm.

Heel and toe 300 dippings/minute (reciprocating motion)

Note: Maximum speed may vary depending on yarn, knitting, lubrication etc.

The figures shown above may require suitable reduction, to be determined according to specific functional tests, when certain types of yarn are used and/or styles with specific types of knitting are made.

6.4.3. PRODUCTION CHARACTERISTICS (TYPES OF POSSIBLE MESH)

Filet, tuck and floated jacquard, 2 feeds, plain knit and jacquard.

5-colour pattern per course, plus background, filet, tuck and 1-feed floated stitch, plain knit or terry .

In areas with warp-knitted fabric, 5-colour pattern per course, plus background, tuck and floated, 1 feed, plain knit or terry.

In areas with warp-knitted fabric, filet, tuck and floated with 4 colours per course, plus 1-feed background, in plain knit or terry.

Two-feed warp-knitted elastic, equal to one elastic course every two knit courses, in plain knit or terry.

Using the second elastic yarn finger, four-colour pattern per course, plus background, tuck and 1-feed floated, in plain knit or terry.

Using the second elastic yarn finger, filet, tuck and floated with 3-colour pattern per course, plus 1-feed background, plain knit or terry.

6.5. TECHNICAL CHARACTERISTICS FOR MACHINES: GK544S/0

Single-cylinder 4-feed machine for the production of socks and pantyhose in plain knit, normal terry and sandwich terry, 4-colour patterns per course at each feed, with both plain knit and terry, heel and toe in reciprocating motion.

Integral electronic programming of sock cycle, style and mesh adjustment.

Machine can store several styles, with 8 sizes per style.

follows the table of Technical Characteristics, divided by machine model:

TABLE OF TECHNICAL CHARACTERISTICS	
DESCRIPTION	**MODELS GK544S/0 (4 colours)**
Cylinder diameters:	4"
Gauge of needles available:	1 mm-0.85 mm-0.70 mm
Number of colours per course:	4 colours per course + 1-feed background
Number of feeds:	4 for the background and colours -1 for the colour
Number of yarn fingers per feeder or feed:	Feeder 1: 9 yarn fingers with 2 pneumatically controller work positions Feeders 2-3-4: 7 pneumatically controlled yarn fingers Colour feeder: 3 pneumatically controlled yarn fingers per feed
Stitch formation units:	Feed 1, pneumatic version with 1- or 2-position vertical dipping: supplied standard for Terry machine; on request for Plain Knit machine Heel return feed, pneumatic version Motorized versions available on request
Needle cam units:	Pneumatic two-stage entry and exit command with position control
Type of needle selection	Electronic needle-needle
Number of actuators with electronic needle-needle selection:	9 actuators
Heel yarn takeup device	Standard version with 4 yarn takeup devices Version with 6 yarn takeup devices on request
Terry sinker caps	Motorised with 2 motors to vary the pressure and/or angle position
Sinker caps, plain knit	High speed, available on request with 1 or 2 motors to vary pressure and/or angle position
Vertical unit for moving cutter and yarn finger plate	Motorised
Cutter with mechanical safety stop device	Cutter with a variable number of teeth on request Variable speed via stepper motor on request

6.5.1. BASIC TABLE OF YARNS THAT CAN BE PROCESSED DEPENDING ON MACHINE GAUGE

Cylinder diameter	Needle thickness	Needle gauge	Machine gauges	Number of needles	yarns that can be used and recommended counts		
					Acrylic (Nm)	Cotton (Ne)	Nylon (Decitex)
4" GK544S/0	1 mm	18	6½-7-7½-8½-9	84-88-96-108-112	1/26	12/1	70/2
			9½	116-120	1/32	14/1	70/2
	0.85 mm	24	6½-7-7½-8½-9	84-88-96-108-112	1/26	10/1-12/1	70/2
			9½-10½	116-120-132	1/26-1/32	10/1-12/1	70/2
	0.70 mm	36	6½-7-7½-8½-9	84-88-96-108-112	1/40	16/1-20/1	44/2-70/2
			9½-10½	116-120-132	1/40	16/1-20/1	44/2-70/2
			11½-12½	144-156	1/40	16/1-20/1	44/2-70/2
			13½-14	168-176	1/40	24/1-30/1	44/2-70/1
	0.60 mm	48	14½-15-15½-16	180-188-192-200	1/50	30/1-60/2	44/2-70/1
			17-18-19-20	216-220-240-256	1/50	40/1-80/2	44/2-70/1

6.5.2. PERFORMANCE ADMITTED

Maximum speed in plain knit, without pattern, 350 rpm.

Maximum speed when processing terry 300 rpm.

Heel and toe 300 dippings/minute (reciprocating motion)

Note: Maximum speed may vary depending on yarn, knitting, lubrication etc.

The figures shown above may require suitable reduction, to be determined according to specific functional tests, when certain types of yarn are used and/or styles with specific types of knitting are made.

6.5.3. PRODUCTION CHARACTERISTICS (TYPES OF POSSIBLE MESH)

4-colour pattern per course plus background, tuck and 1-feed floated, in plain knit or terry.

3-colour pattern per course plus background, filet, tuck and 1-feed floated, in plain knit or terry.

In the areas with wrap-knitted elastic, 3-colour pattern per course, plus background, tuck and 1-feed floated, in plain knit or terry.

In the areas with wrap-knitted elastics, filet, tuck and floated with 2-colour pattern per course, plus 1-feed background, in plain knit or terry.

Tuck and floated in 4-feed jacquard, in plain knit or terry.

Zone with two-feed elastic in plain knit or terry.

Zone with two-feed filet in plain knit or terry.

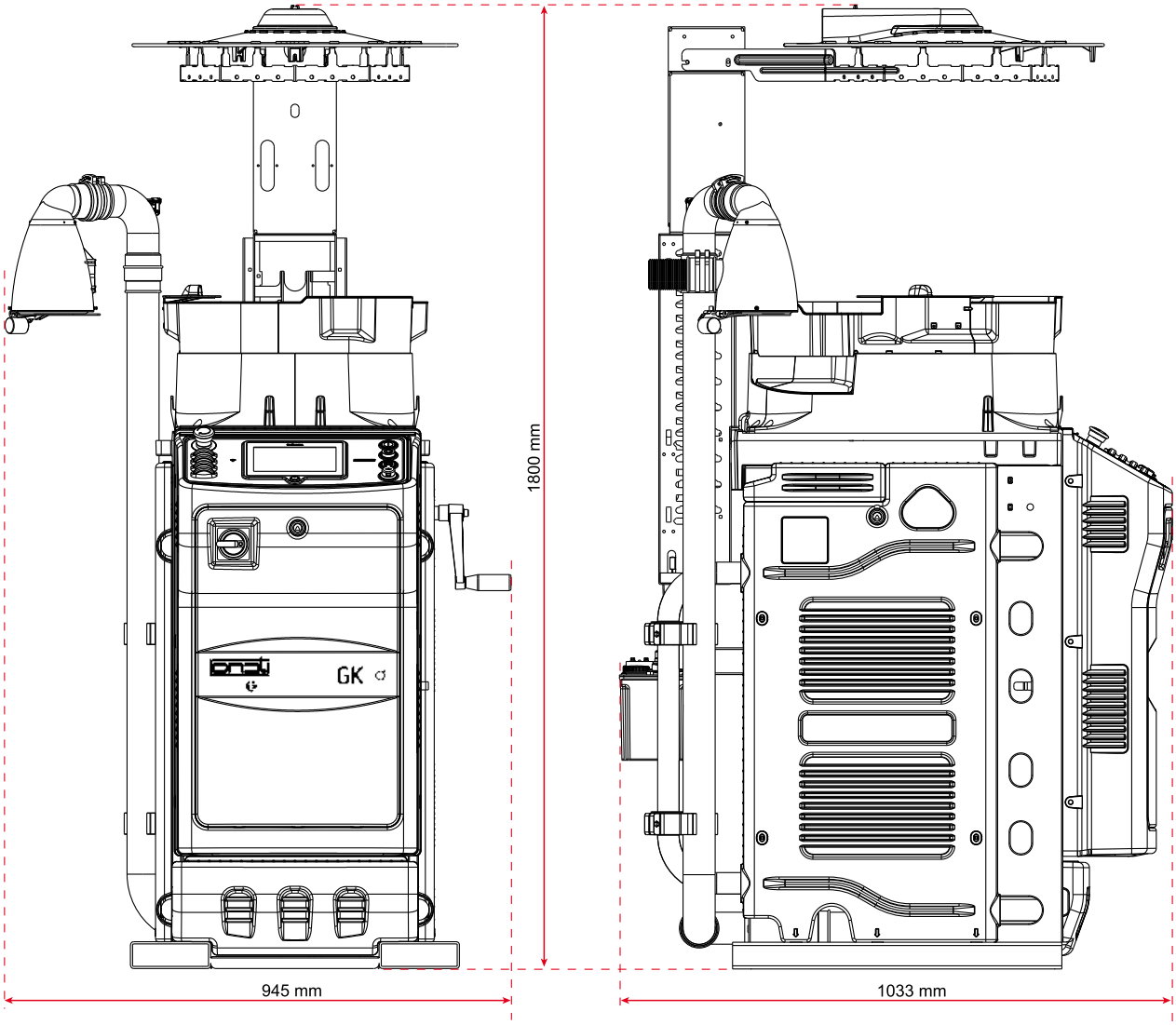
6.6. DIMENSIONS AND WEIGHTS

The overall dimensions of individual machine or machine combined to different creels.

The table of “Dimensions and Weights” also shows the weights and dimensions of the shipping crate containing the creels and optional devices that are despatched together with the machine.

6.6.1. DIMENSIONS OF MACHINE SERIES GKS/0-GKD

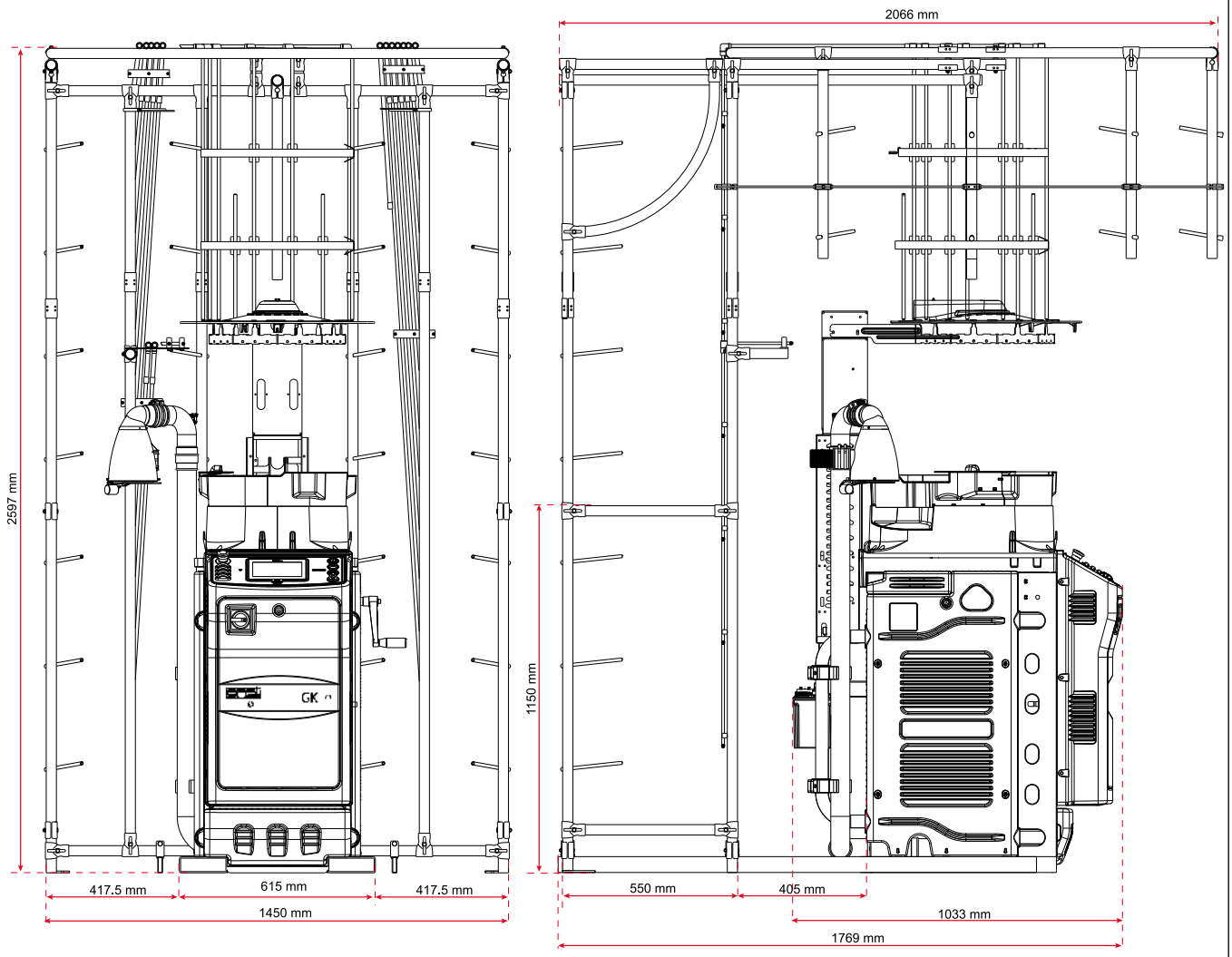
Figure No.6.6.a



Dimensions of machine series GKS/0-GKD

6.6.2. DIMENSIONS OF MACHINE SERIES GKS/0-GKD WITH CREEL G1930213

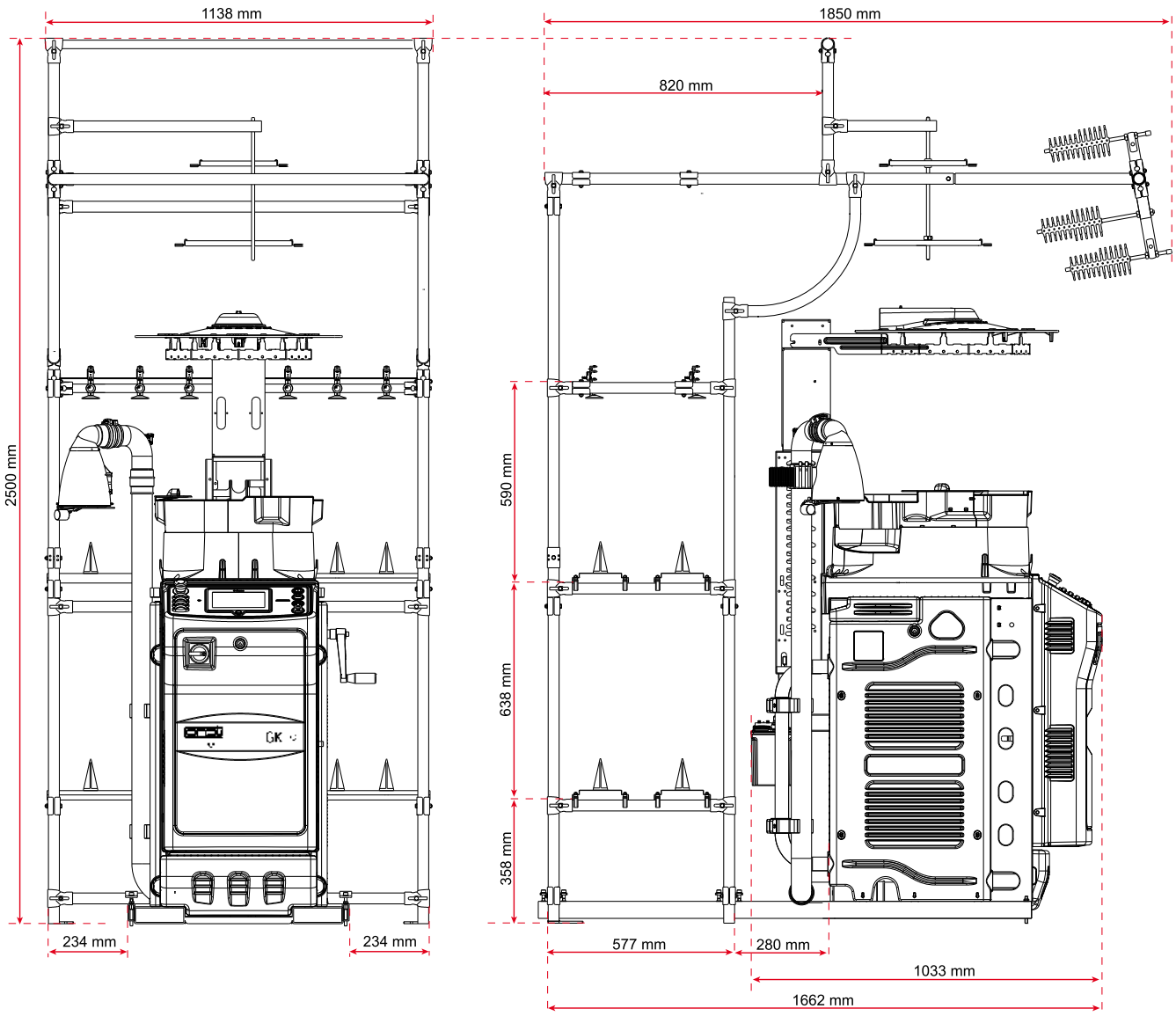
Figure No.6.6.a



Dimensions of machine series GKS/0-GKD with creel G1930213

6.6.3. DIMENSIONS OF MACHINES SERIES GKS/0-GKD WITH CREEL G3930061

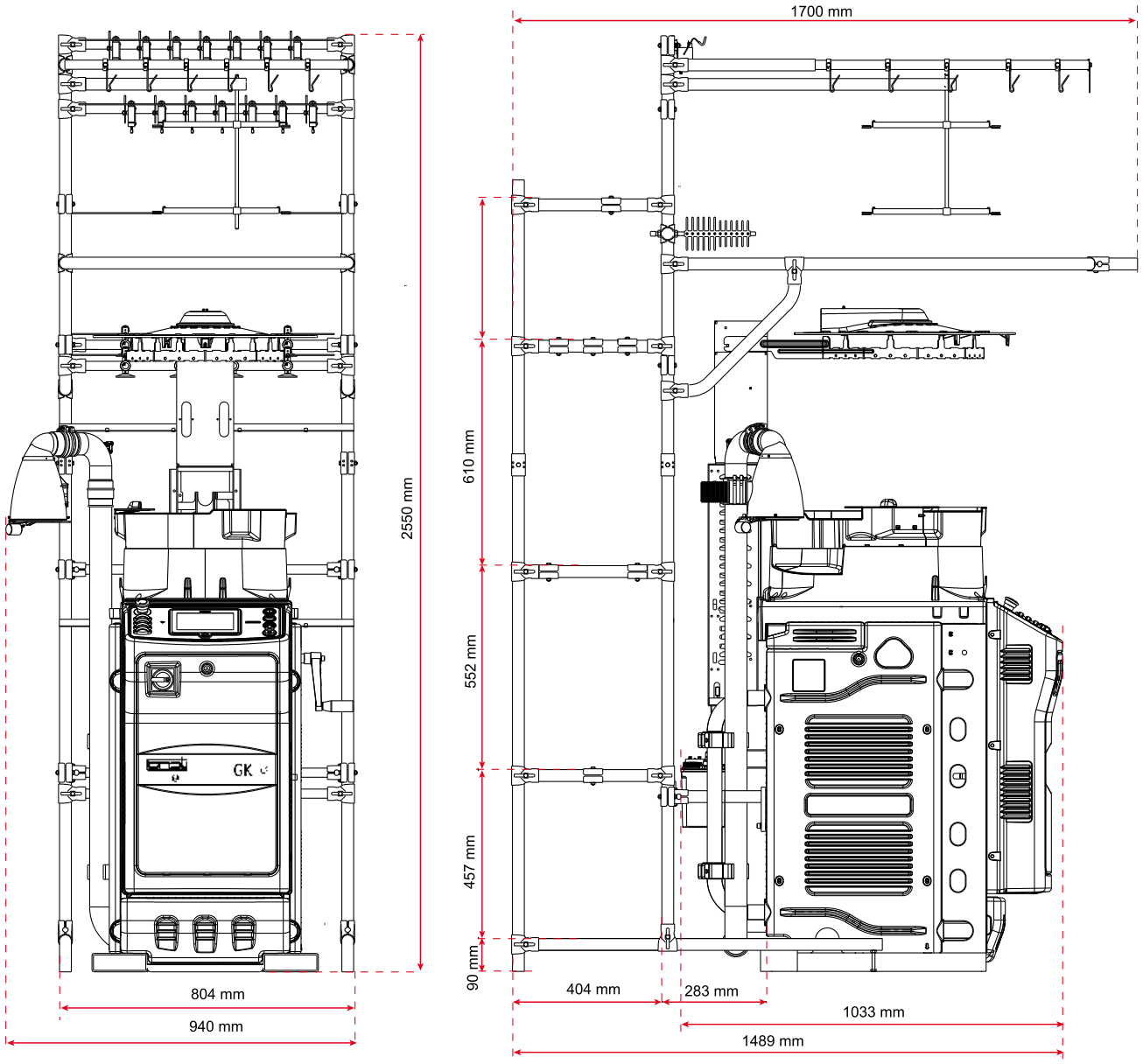
Figure No.6.6.a



Dimensions of machines series GKS/0-GKD with creel G3930061

6.6.4. DIMENSIONS OF MACHINE SERIES GKS/0-GKD WITH CREEL G1930040

Figure No.6.6.a



Dimensions of machine series GKS/0-GKD with creel G1930040

6.6.5. TABLE OF DIMENSIONS AND WEIGHTS

TABLE OF DIMENSIONS AND WEIGHTS series GKS/0-GKD				
DESCRIPTION	**FRONT WIDTH**	**SIDE WIDTH OR DEPTH**	**HEIGHT**	**WEIGHT**
Machine series: GKS/0-GKD (see the attached drawings for other dimensions)	945 mm	1033 mm	1800 mm	230 kg (net weight based on standard model without antitwist)
Machine series: GKS/0-GKD with creel G1930213 (see attached drawings for other dimensions)	1450 mm	1769 mm	2597 mm	295 kg (net weight of machine plus creel)
Machine series: GKS/0-GKD with creel G3930061 (see attached drawings for other dimensions)	1138 mm	1850 mm	2500 mm	281 kg (net weight of machine plus creel)
Machine series: GKS/0-GKD with creel G1930040 (see attached drawings for other dimensions)	940 mm	1700 mm	2550 mm	250 kg (machine net weight plus creel)
Shipping crate	1112 mm	830 mm	2040 mm	70 kg (net weight of crate only)
Shipping crate (2.2 Kw suction fan)	1112 mm	830 mm	2040 mm	76 kg (net weight of crate only)
Creel G1930213 (placed in the same shipping crate of the machine)				65 kg (net weight of creel)
Creel G3930061 (placed in the same shipping crate of the machine)				kg 51 (net weight of creel)
Creel G1930040 (placed in the same shipping crate of the machine)				20 kg (net weight of creel)

TABLE OF DIMENSIONS AND WEIGHTS series GKS/0-GKD				
DESCRIPTION	**FRONT WIDTH**	**SIDE WIDTH OR DEPTH**	**HEIGHT**	**WEIGHT**
Suction fan on request (placed inside the machine shipping crate)				22 kg (net weight of the 1.1kW fan) 30 kg (net weight of the 2.2kW)
Optional anti-twist device (mounted on machine)				kg 17 (net weight of device) to be added to the machine weight
Optional LGL yarn feeders (placed inside the machine shipping crate)				kg 2.2 each Compact LGL 2.8 kg for each Eco Power LGL kg 5 package containing 2 Compact LGLs 6.2 kg packing containing 2 LGL Eco Power storage feeder
Optional YO-YO positive yarn feeders by Dinema (placed inside the machine shipping crate)				kg 0.725 each YO-YO with packaging

6.7. CONSUMPTION DATA AND SPECIFICATIONS

6.7.1. COMPRESSED AIR CONSUMPTION

TABLES OF CONSUMPTION DATA AND SPECIFICATIONS series GKS/0-GKD COMPRESSED AIR CONSUMPTION			
MACHINE MODELS	**Consumption per sock** **Nl/ft³**	**Sock cycle time**	**Consumption per minute** **Nl/min-cfm**
GK516S/0-GK516D-GK615S/0-GK616S/0-GK616D-GK715S/0-GK716S/0	Standard sock 11 / 0,388	Standard sock 2'45"	Standard sock 4 - 0,141
GK525S/0-GK625S/0-GK725S/0	Standard sock 11 / 0,388	Standard sock 2'45"	Standard sock 4 - 0,141
GK544S/0	Standard sock 11 / 0,388	Standard sock 1'10"	Standard sock 9 - 0,317

6.7.2. SUCTION AIR CONSUMPTION

TABLES OF CONSUMPTION DATA AND SPECIFICATIONS series GKS/0-GKD SUCTION AIR CONSUMPTION	
SUCTION	**BASED ON MEDIUM SOCK PROGRAMME**
Consumption of models GKS/0-GKD:	2,5 m³/min
Cylinder suction:	850 mm/water column
Suction intake of the cutter unit:	850 mm/water column

6.7.3. AVERAGE OIL CONSUMPTION

- The estimated average oil consumption is 270 g every 100 dozen socks.

6.7.4. NOISE EMISSION

The following maximum noise emission table is valid for all GOAL models in the GK series.

TABLE OF MAXIMUM ACOUSTIC EMISSIONS MEASURED FOR GK SERIES MACHINES		
Sound-pressure level at the reference surface	LPA	79,5 dB
Sound intensity level	LWA	96,6 dB
PEAK		109,3 dB

6.7.5. ELECTRICITY CONSUMPTION

Electricity consumption was calculated with a standard programme for medium-type sock over one-hour production.

The electricity absorbed by a machine can vary according to the type of style, size, running-in of flat parts, the number of cylinder needles and the maximum sock cycle running speed.

TABLES OF CONSUMPTION DATA AND SPECIFICATIONS series GKS/0-GKD ELECTRICITY CONSUMPTION	
MACHINE MODELS	**BASED ON MEDIUM SOCK PROGRAMME**
GK516S/0-GK516D-GK615S/0-GK616S/0-GK616D-GK715S/0-GK716S/0	0.40 - 0.45 kWh
GK525S/0-GK625S/0-GK725S/0	0.45 - 0.50 kWh
GK544S/0	0.55 - 0.60 kWh

6.7.6. RECOMMENDED LUBRICANTS

TABLE OF RECOMMENDED LUBRICANTS	
LUBRICANT	**PRODUCT BRAND**
Type of oil recommended:	KLUBER "MADOL 183 supreme" FUCHS "TRAX16C"
Type of grease recommended:	DAMPING GREASE NYOGEL 774F-1

Attention: LONATI cannot be held liable for damage to or malfunctions of the machine caused by failing to comply with the instructions regarding the lubricants to be used.

7 RULES REGARDING THE MACHINE PACKING

7.1. PACKING METHODS FOR SHIPPING THE MACHINE

The machine is supplied to customer as follows:

- Fixed to a wooden base, wrapped in a waterproof sack and locked in a wooden crate.
- Fixed on a wooden base and wrapped in a waterproof bag for containerized shipments only.
- The machine is shipped in perfect operating conditions, after having been subjected to strict inspections carried out at LONATI premises.
- The machine is delivered ready mounted, but for packaging and protection purposes some machine components are disassembled and positioned as follows, depending on the two types of shipment:

Standard shipment in a crate:

- If the machine is shipped in a crate, the following units are dismantled and placed inside the base: the side guards protecting the cylinder head zone, the hood yarn finger suction tube; while the yarn suction filter and connection pipes, the suction fan cable, the suction tube and the accessory kit for connection of the additional suction fan are present only according to required specifications.
- The hood unit and its fixing plate are disassembled and repositioned so as to bring the unit closed to the machine structure.
- The following parts are disassembled and placed on the machine frame: the envelope containing the crank and fixing screw, a bag containing 4 shims and screws for levelling the machine plus two salt bags for protection against corrosive agents.
- The shipping crate accommodates the machine and any optionals, such as the creel, yarn feeders and the additional suction fan, which is fixed inside the front panel with two screws that are visible from the outside.

Standard shipment on a platform (only in a container):

- With this type of shipment the following units are disassembled and placed inside the machine base: the side guards protecting the cylinder head zone, the hood yarn finger suction tube; while the yarn suction filter and connection pipes, the suction fan cable, the suction tube and the accessory kit for connection of the additional suction fan are present only according to required specifications.
- The lubrication pump is displaced and temporarily fixed further down but it is not disconnected, while the hood unit and fixing plate are disassembled and placed in a position closed to the machine structure.
- The following parts are disassembled and placed on the machine frame: the envelope containing the crank and fixing screw, a bag containing 4 shims and screws for levelling the machine plus two salt bags for protection against corrosive agents; all the power cables of the electronic selection units on the lower dial are also disconnected.
- The machines are placed inside the container and fixed together with special brackets screwed onto the fixing points of the guards.
- Any optionals, such as creels or fans are packaged and placed in the container together with the machines so as to prevent them from moving during handling operations.

For reassembly operations, refer to the chapter entitled “Installation” under subsection “Reassembling separate units”.

7.2. MACHINE SHIPPING METHOD

The machine can be sent to the place of installation using any of the following modes of transport:

- By road, by lorry.
- By sea, in a container.
- By air.

7.3. HANDLING OF THE SHIPPING CRATE

To prevent damaging the machine, the shipping crate containing the machine and related devices should always be handled carefully, following the instructions given on the adhesive label stuck onto the front of the crate, as shown below.

The instructions on the label are translated into the language of the country of destination of the crate.

Place the two forks for the forklift truck as separate as possible from each other.

Figure No.7.3.a

CAUTION!: unbalanced weight

NO

NO

NO

NO

Comply with the conditions described

7.4. STORING THE SHIPPING CRATE

The crate containing the machine must be stored in strict compliance with the following recommendations:

- Never leave the crate outdoor for any reasons whatsoever awaiting the installation.
- The crate must be stored in a dry sheltered place at controlled ambient conditions, as described under the Required Environmental Conditions section in the Installation chapter.
- Do not place the crate underneath or on top of another.
- The crate must be handled with the utmost care so as to avoid impacts that could seriously damage the machine.
- If the crate needs to be kept stored for long time, it is advisable to periodically its state to make sure it not subject to deterioration.
- For storage purposes, the machine must raised and moved using a forklift truck and/or a manual drawbar-operated carriage for handling standard pallets, taking care not to cause damage to the machine, following impact, abrasion and other abnormal conditions.

7.5. UNPACKING THE MACHINE

Proceed as follows to unpack the machine:

Figure No.7.5.a

Front view of the shipping crate and the opening side

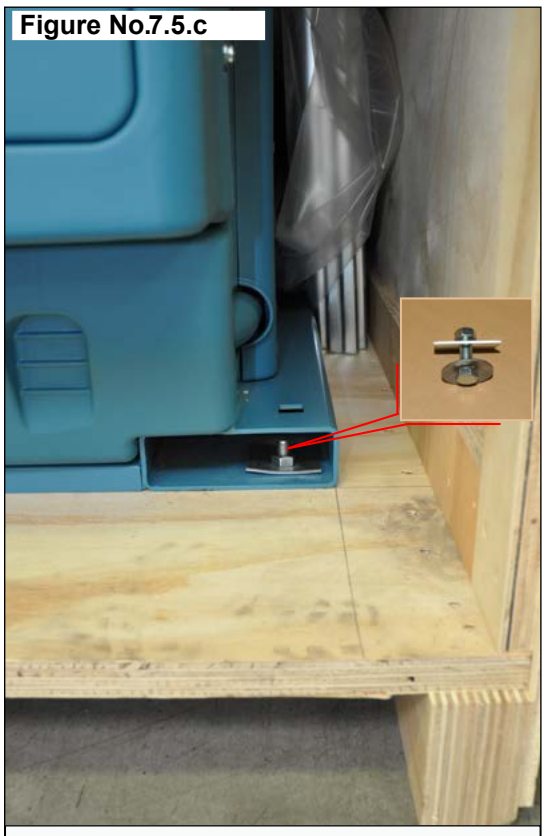
Attention:

When removing the panels from the shipping crate during unpacking, great care must be taken in handling the component parts inside it which, for various reasons, may have detached from the point of anchorage and create a hazard.

Figure No.7.5.b

The inside of the crate

Figure No.7.5.c



Unscrew the fixing screws

Attention: It is absolutely forbidden to unpack the crate using power saws or breaking through the panel using hammers or other tools, as the contents would be damaged irreparably!

9) For machines series GKS/0-GKD the crate must be opened from the left side as shown, bearing in mind that the front wall is the one marked with a label containing crate handling instructions.

10) Remove all metal staples and any nails fixing the left side panel; do not loosen the 2 screws shown on the front panel as they secure the optional suction fan inside the crate.

11) Take out the boxes containing the disassembled parts of the creel and any other optional devices and remove the suction fan by unscrewing the two screws from the front panel.

12) Remove the waterproof bag protecting the machine.

13) Unscrew the 4 screws and bolts fixing the machine to the wooden base.

8 INSTALLATION

LONATI cannot be held liable for risks to the safety of personnel or damage to the machine caused by failing to comply with instructions in this chapter and chapters 1 and 2.

8.1. GENERAL CONDITIONS FOR THE INSTALLATION OF THE MACHINE

The machine must be installed in strict compliance with the instructions given in the related subsection in this chapter.

8.1.1. SUITABILITY OF ENVIRONMENTAL CONDITIONS

The machine must be installed, used and maintained in an environment that complies with the following requirements:

- Ensure industrial or workshop premises suitably covered and protected from the outside with appropriate windows and doors and emergency exits, in accordance with existing legislation in the country of use of the machine.
- Ensure working conditions in full compliance with existing legislation on occupational safety in the country of use of the machine.
- Do not install the machine in explosion-hazardous environments.
- Avoid the presence of abrasive dust and air currents in the site where the machine is installed.
- Do not install the machine in the vicinity of sources of heat and/or moisture and places exposed, directly or indirectly, to rain and/or water seepage.

8.1.2. DO NOT INSTALL THE MACHINE NEAR SOURCES OF HEAT AND/OR MOISTURE AND IN PLACES EXPOSED, DIRECTLY OR INDIRECTLY, TO RAIN OR WATER INFILTRATIONS. !DA DUPLICAZIONE!

Do not install the machine near sources of heat and/or moisture and in places exposed, directly or indirectly, to rain or water infiltrations. !da duplicazione! !da duplicazione!

- Storage temperature from -15°C to +55°C.
- Operating temperature from +10°C to +40°C.
- Relative humidity from 50% to 80% with no water condensate.
- Altitude 0 m to 2000 m above sea level.

8.1.3. POWER SUPPLY REQUIREMENTS

The power supply conditions required for the correct operation of the machine are described in the following table:

Table of power voltages available for the various EU and non-EU countries	
Mains power voltage	**Mains frequency**
200V-210V-220V-230V-240V-380V-400V-415V-440V-480V	50-60 Hz ±10%

Attention: The above mains power supply and frequency values are alternative, i.e. they depend on the place where the machine is installed and refer to possible variants that characterize the onboard transformer.

For values other than those specified above, it is indispensable to contact the LONATI Customer Service only.

8.1.4. COMPRESSED AIR SUPPLY REQUIREMENTS

The compressed air supply conditions required for the correct operation of the machine are:

Compressed air supply pressure 6.5 bar with humidity at 0% drier output temperature 18°/21°C.

Attention: The compressed air supply pressure must be kept constant at the value specified, a lower value could cause repeated machine stops, a higher value could cause damage to the machine and, more seriously, jeopardise personal/collective safety.

The machine must be supplied with previously dehumidified and filtered compressed air, otherwise LONATI does not guarantee the correct functioning of the machine.

The air compressor must be installed in an environment where the air sucked in is free from gasoline fumes, alcohol or other chemicals that could cause damage to the seals of the components in the compressed air system of the machine.

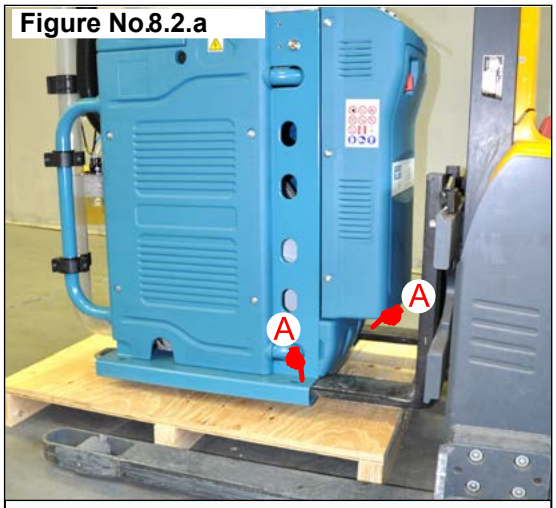
8.2. POSITIONING THE MACHINE ONTO THE FLOOR

First check that the elements fixing the machine are not loose and/or missing and the outer parts of the machine have not been damaged when handling the packing crane, otherwise any damage found must be reported immediately to the forwarding agent.

Attention: To lift and move the machine only use the gripping area (A) in the slots of the lower part of the base, using a forklift truck.

Check first the load capacity and grip effectiveness of the fork lift-truck or any other similar system used, for personal safety reasons, do not stand within the range of the suspended load or along the direction of movement.

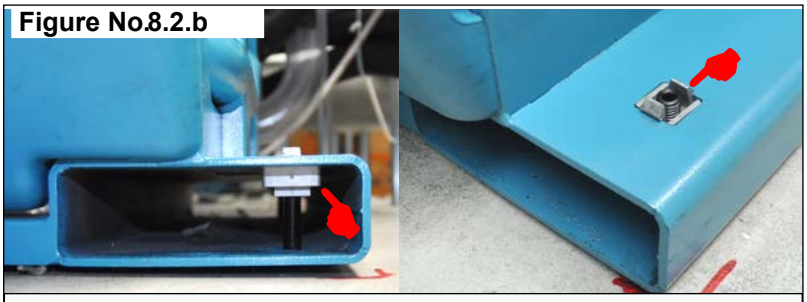
Figure No.8.2.a



Gripping point A for moving the machine

1) Raise the machine from the base of packaging using the fork lift-truck or another similar means.
2) Place it in the desired point and lower it very carefully.

Figure No.8.2.b



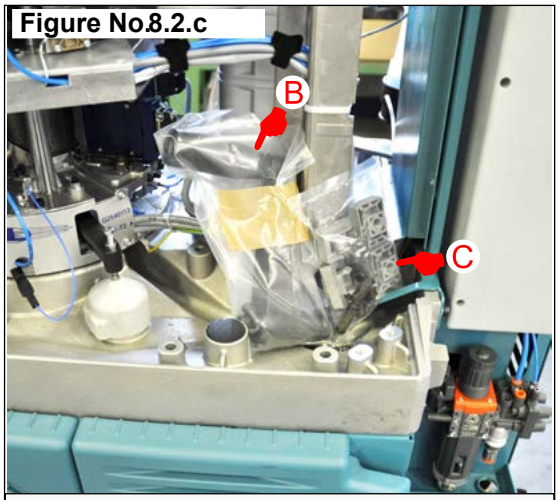
Fitting the set screw shims for levelling purposes

3) The four shims supporting the set screws packed in the envelope (C) on the machine frame can now be installed as follows:
4) Insert the adjusting screw wedge into the slits used for transportation and hook it to the square slot on the upper side.
5) Tighten the Allen screw until it rests against the floor.

Note:
The machine must be positioned in the desired spot of the floor in accordance with the indications shown in the general installation layout in consideration of the remaining units installed nearby, especially in such a way that he space required for operation of the machine is available.

The floor structure must be unyielding, so if it does not possess the strength and stability required, it may be necessary to provide for a concrete foundation underneath each point of support of the machine.

Figure No.8.2.c



Area for the positioning of the bags containing disassembled parts

8.3. LEVELLING UP THE MACHINE

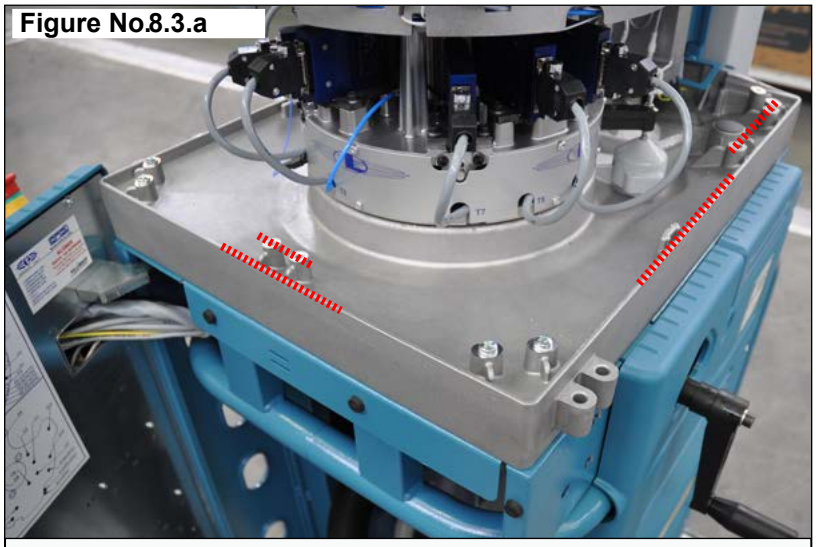
The machine must be levelled up to avoid the accumulation of oil in certain areas of the base of the machine and allow oil to return to the lubrication pump for the recovery and filtering.

The machine must be levelled up to avoid any vibration during operation, with the result of any mechanical and/or electronic anomalies that could cause more serious faults if not remedied promptly, and increased noise level in the workplace.

It is advisable to check the correct levelling of the machine after about a month of work.

Proceed as follow to level up the machine:

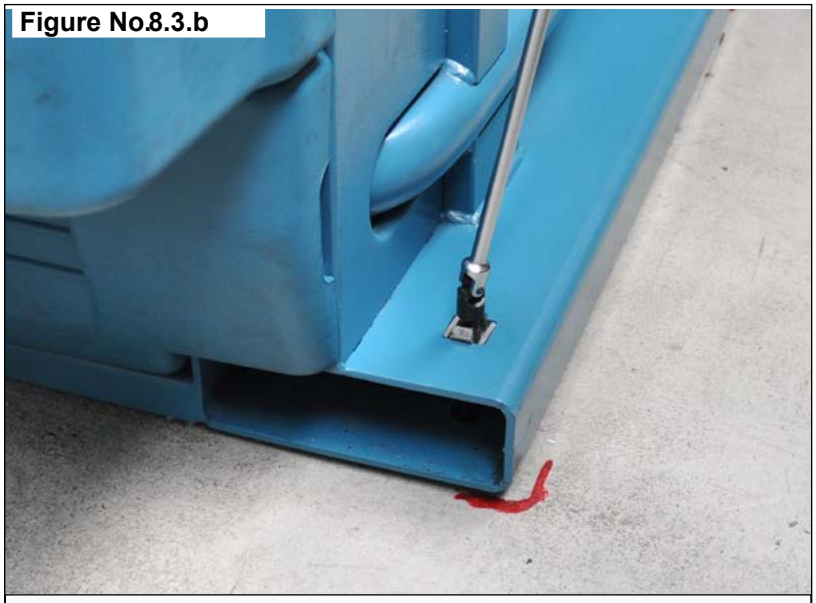
Figure No.8.3.a



Possible areas to be used for supporting the spirit level

1) Open the electrical cabinet to access to the front of the machine base.
2) Place a spirit level onto the front and longitudinal planes alternately, making reference the areas marked.
3) Adjust the four screws of the blocks until the machine is at level.

Figure No.8.3.b



Adjust the four levelling screws

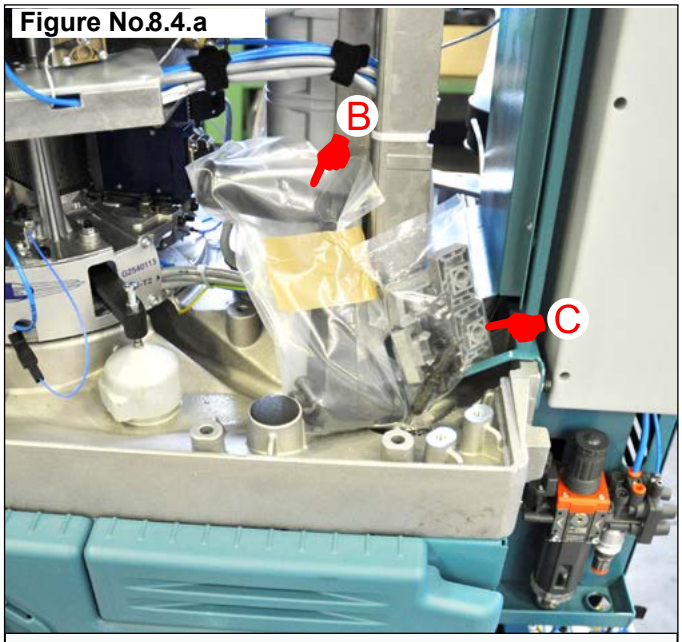
8.4. REASSEMBLING THE SEPARATE COMPONENT PARTS

When the machine has been levelled, the parts or units that had been disassembled for shipping purposes in the crate or shipping platform need to be reassembled.

If necessary, refer to the spare parts catalogue for details on the assembly sequence.

8.4.1. REASSEMBLING THE CRANK

Figure No.8.4.a



Parts disassembled, envelope (B)

1) Several envelopes containing disassembled parts are placed on the machine: envelope (B) contains the crank and fixing screw.
2) Remove the cover on the left side guard to access the crank holding unit.

Figure No.8.4.b

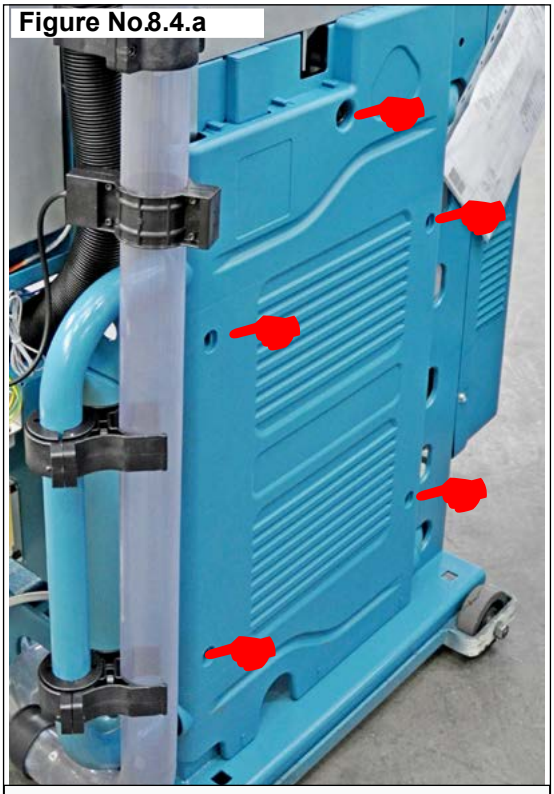
Cover for access to the crank holding unit

Figure No.8.4.c

Remount the crank

8.4.2. REPOSITIONING THE SOCK EJECTION HOOD PLATE

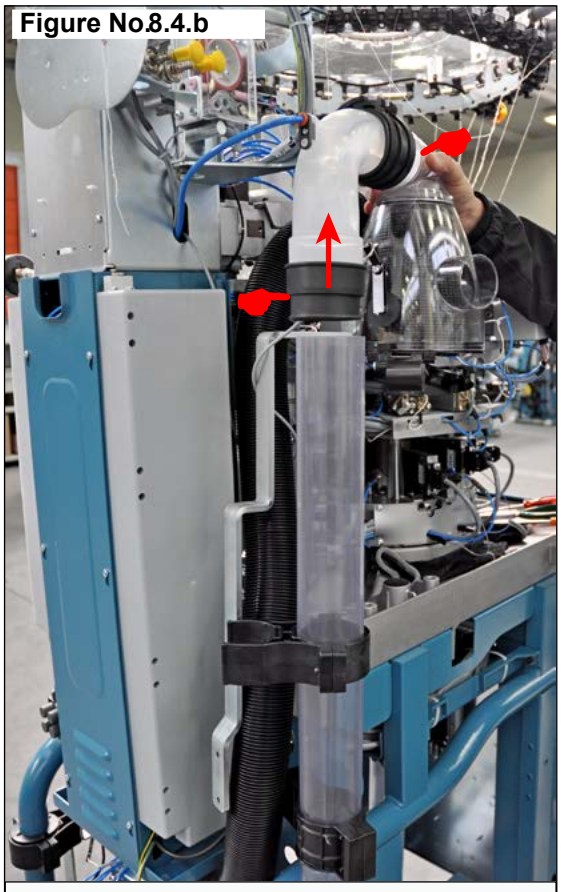
Figure No.8.4.a



Step 1

1) Detach the right side guard on the sock ejection hood side by removing the set screws.

Figure No.8.4.b



Step 2

2) Disconnect by polling upwards the plate holding unit as shown.

Figure No.8.4.c

Step 3

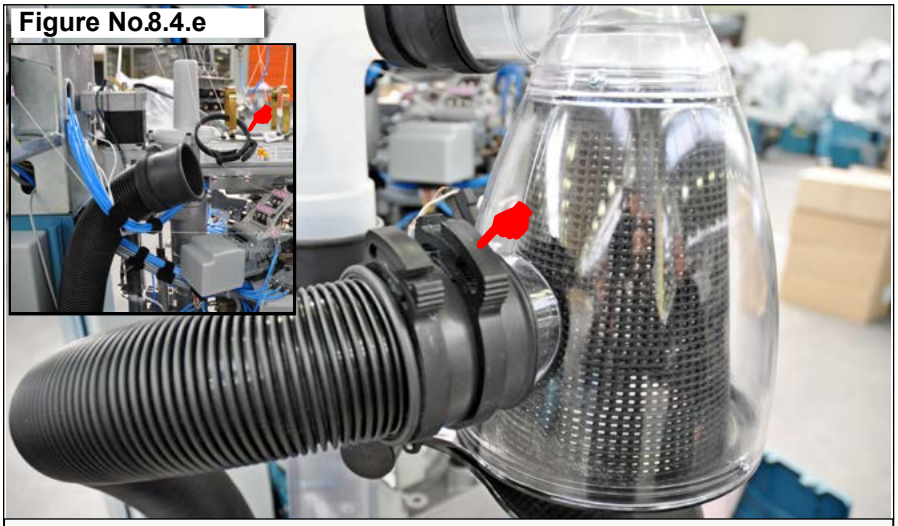
Rotate the unit internally by moving the plate towards the fixing holes, then replace the sock ejection hood unit in its position.

Figure No.8.4.d

Step 4

3) Fix the plate with the 2 screws in the fixing holes.

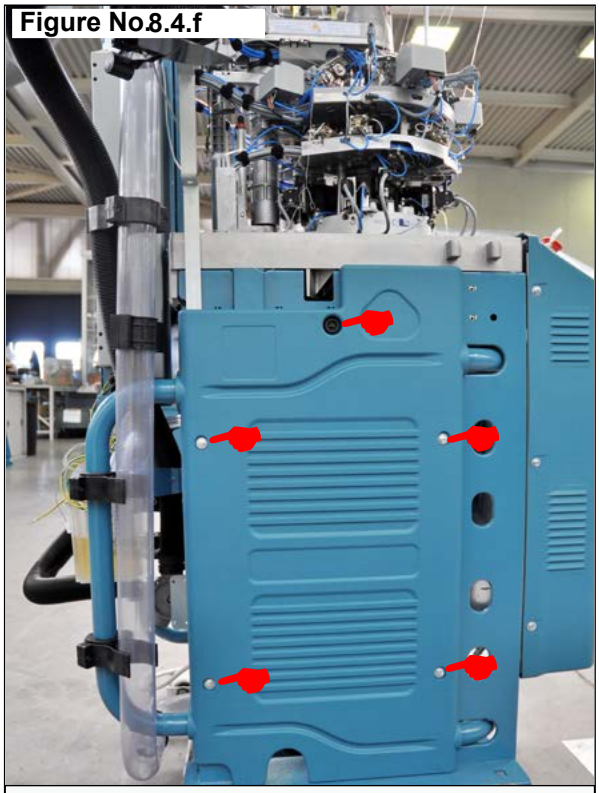
Figure No.8.4.e



Step 5

4) Insert the band on the seal and reconnect the suction tube and the hood blower tube, if required.

Figure No.8.4.f



Step 6

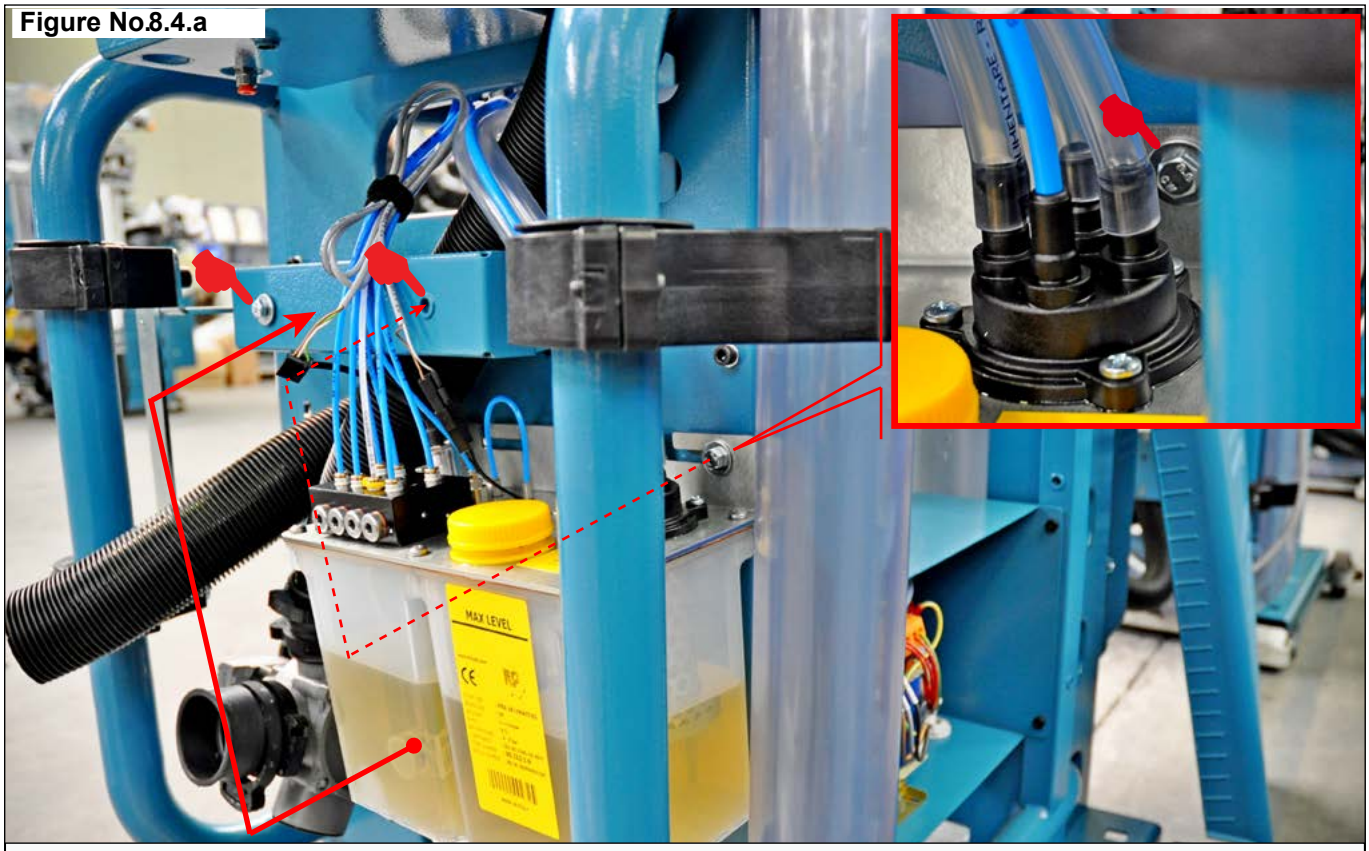
5) Reposition the guard by securing it with screws.

8.4.3. REPOSITIONING THE LUBRICATION PUMP

This situation only occurs with machines fixed onto a platform and fixed together for containerised shipment.

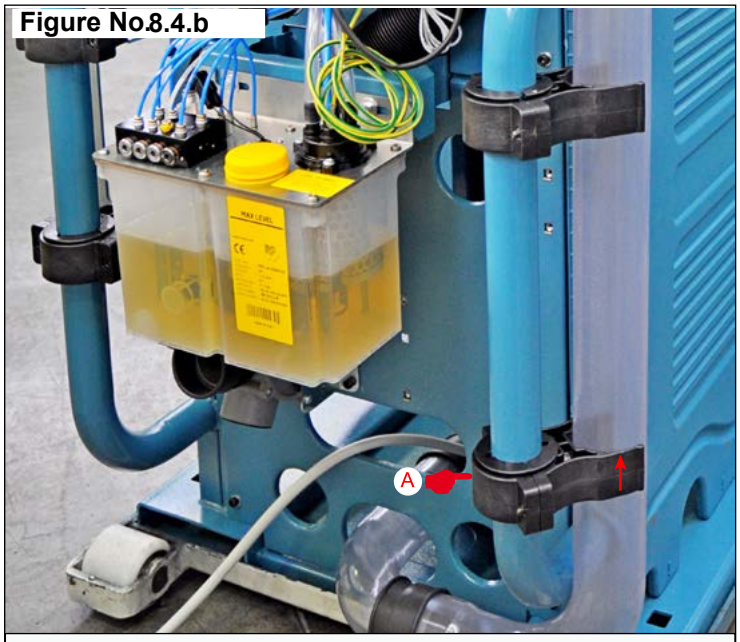
To facilitate the positioning of the lubrication pump temporarily, the sock pipe bracket (A) has been lowered.

Figure No.8.4.a



Reposition the pump

Figure No.8.4.b



Reposition the bracket (A)

1) Unscrew the two screws shown, one of which is used to fix pump repositioning.
2) Reposition the pump on the support bar by fixing it with the screws provided.
3) Reposition the bracket (A) by raising it slightly.

8.4.4. DISASSEMBLED PARTS INSIDE THE MACHINE BASE

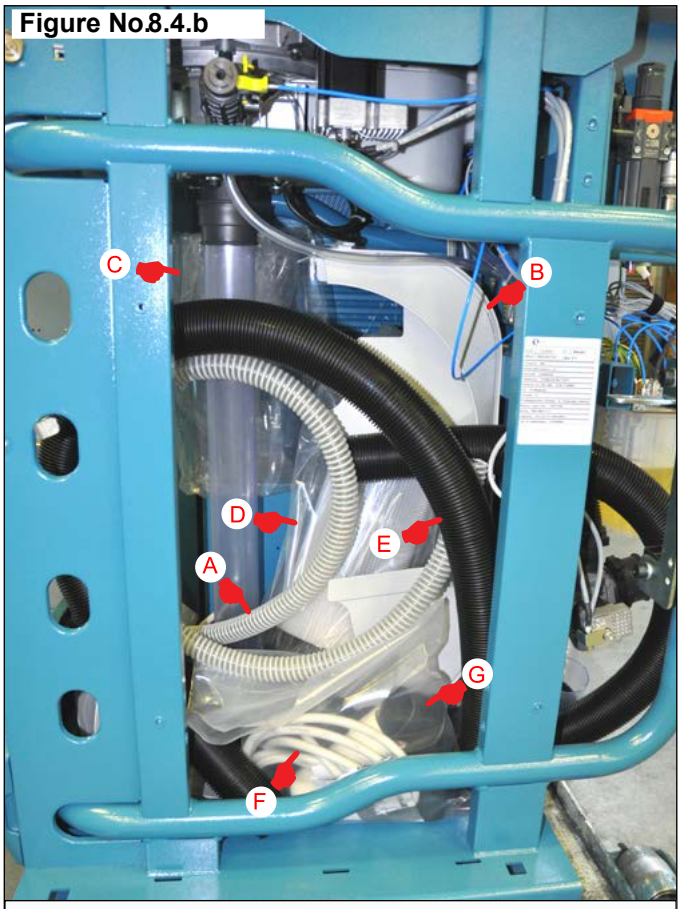
The components parts that are disassembled and to be placed inside the machine base may vary according to the choice made.

The following component parts are placed inside the machine base in either type of shipping:

Figure No.8.4.a

Front view of the base, possible insertion of component parts

Figure No.8.4.b



Side view of the base, possible insertion of component parts

Standard component parts:

- A) White tube for yarn suction connection from the yarn finger hood in the cutter area.
- B) Side guards protecting the cylinder head area.

Component parts supplied with optional fan

- C) Transparent tube as the upper part of the finger yarn hood suction filter.
- D) Transparent tube unit with filter and accessories, as the lower part of the finger yarn hood suction filter.
- E) Black tube for fan suction connection.
- F) Power cable for fan connection.
- G) Kit envelope with fan assembly component parts.

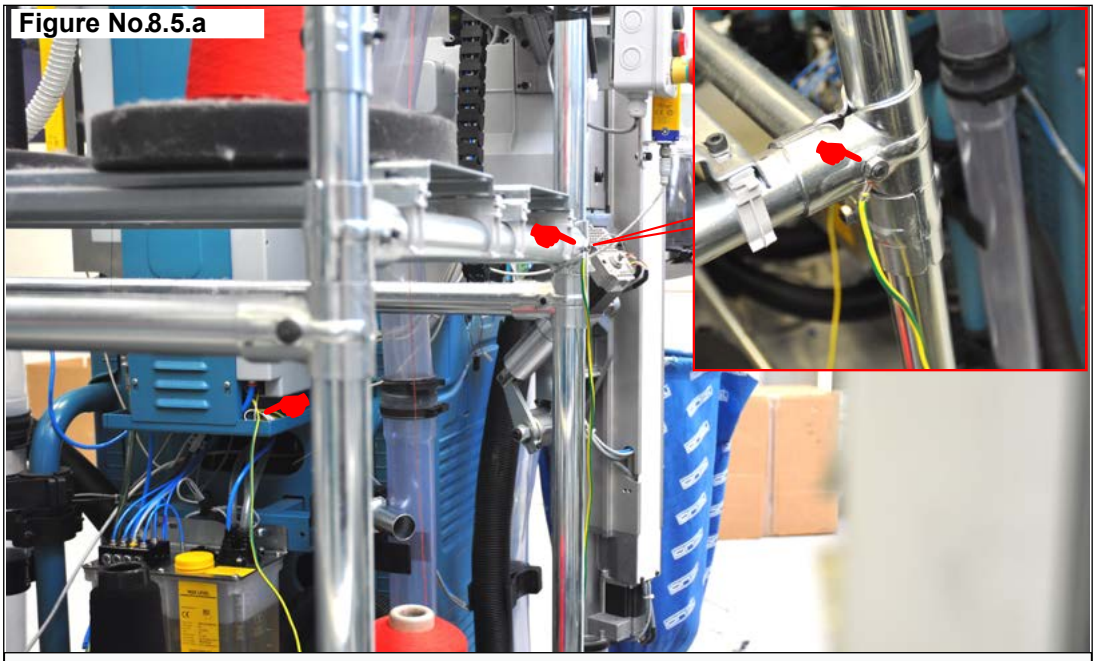
8.5. CONNECTING THE MACHINE TO EARTH FOR THE REEL STAND

Installation of the reel stand requires connection to earth. To do this, use the earth cable (green/yellow) that is already wired in the machine at the exit of the solenoid valve box (pressure regulator area) together with the connection cable for any strain-relief devices mounted on the creel.

Make the connection using the fixing screw-nut point of the creel closer to the earth cable at the output of the machine.

For added safety, it is mandatory to connect the creel to the general earthing point of the machine power supply line.

Figure No.8.5.a



Connecting the earth cable between machine and creel

8.6. GENERAL INSPECTION

Check that, due to preceding operations (such as the positioning of machine onto the ground, levelling up, and the assembly of separate units), some fixing devices of the machine are not loose and/or missing and the outer parts of the machine are not damaged.

8.7. ANTI-OXIDANT MIXTURE

A special anti-oxidant mixture is sprayed onto the machine before shipping for protection during transportation.

Before starting up the machine, it is advisable to thoroughly lubricate all moving parts with the oil recommended in the relevant subsection of the chapter on technical dimensions and consumptions characteristics.

8.8. CONNECTING THE MACHINE TO THE CENTRALISED SUCTION SYSTEM

The machine can be connected to the centralised suction system when it is not equipped with an electric fan, as follows:

Use a vacuum gauge to check that the suction values in the sock suction area of the cylinder correspond to the values shown in the Cylinder Suction table under subsection Suction Air Consumption of the chapter on technical dimensions and consumption characteristics.

8.9. CONNECTING THE MACHINE TO THE CENTRALISED COMPRESSED AIR SYSTEM

The following must be borne in mind before connecting the machine to the centralised compressed air system:

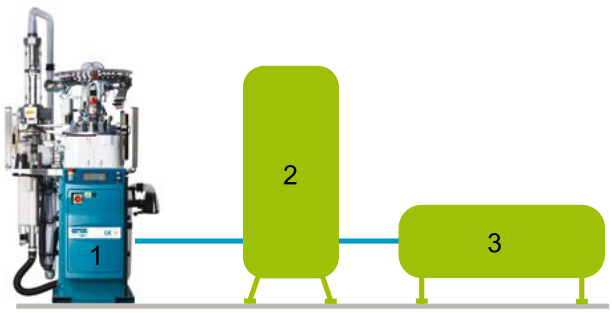
Install a drying system at the air compressor outlet to prevent the formation of condensate.

We recommend any of the following manufacturers who can supply the appropriate model of dryer according to the number of machines to be connected:

- Kaeser
- Atlas Copco

Refer to the diagram below to connect the machine to the compressed air system:

Figure No.8.9.a



1 Machine-2 Tank -3 Compressor + dryer

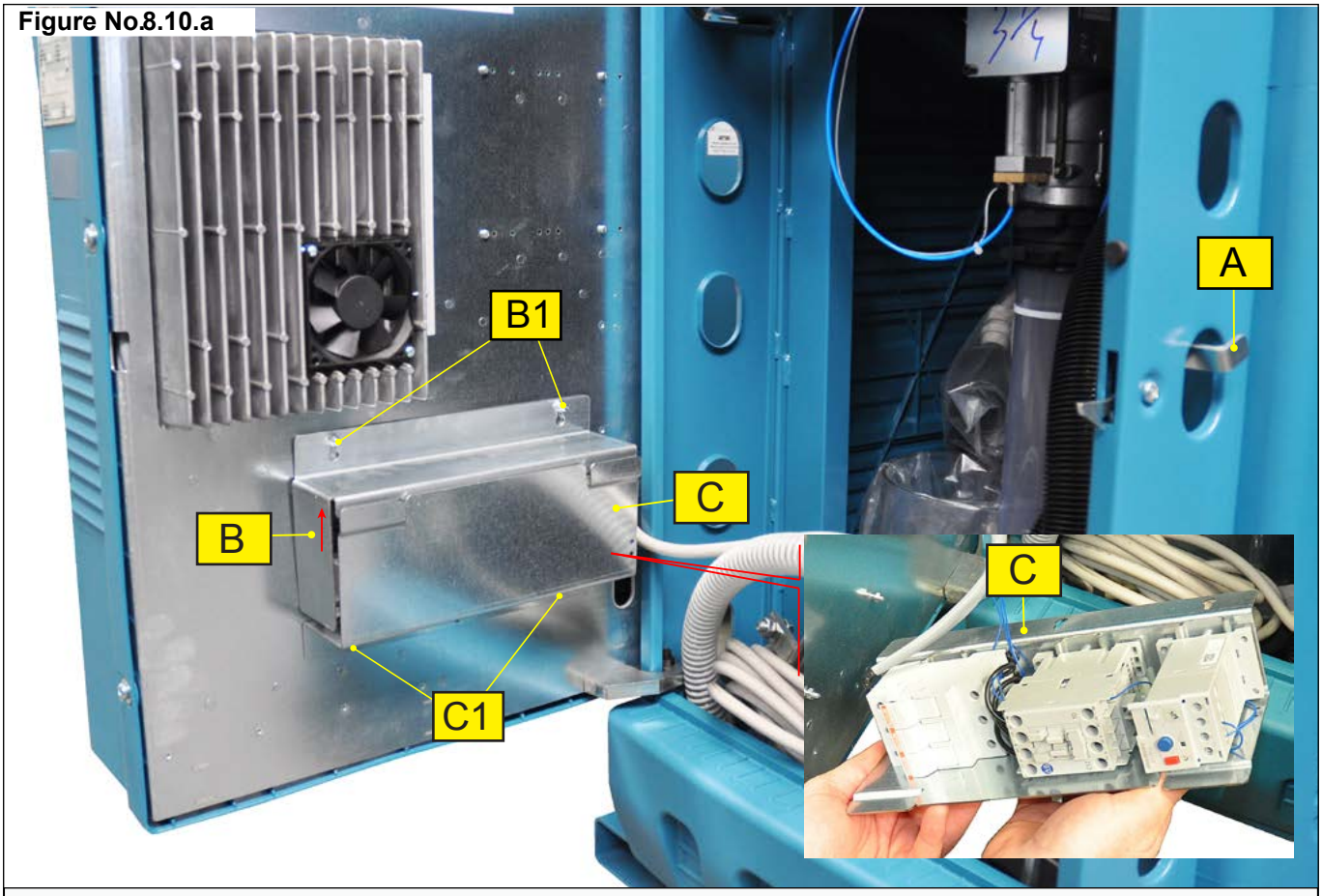
8.10. CONNECTING THE FAN POWER SUPPLY CABLE TO THE MACHINE CONTACTORS

Attention: Before performing any operations (checks, disassembly, etc.) inside the electrical cabinet, switch off the machine completely, as outlined in the Use chapter in the subsection on switching off the machine, by disconnecting the power cable from the mains power socket.

If the machine is supplied with a suction fan, the power supply cable for connection between machine and fan is inside the base, together with other units.

Proceed as follows to connect the power cable to the contactors present on the plate of the electrical cabinet:

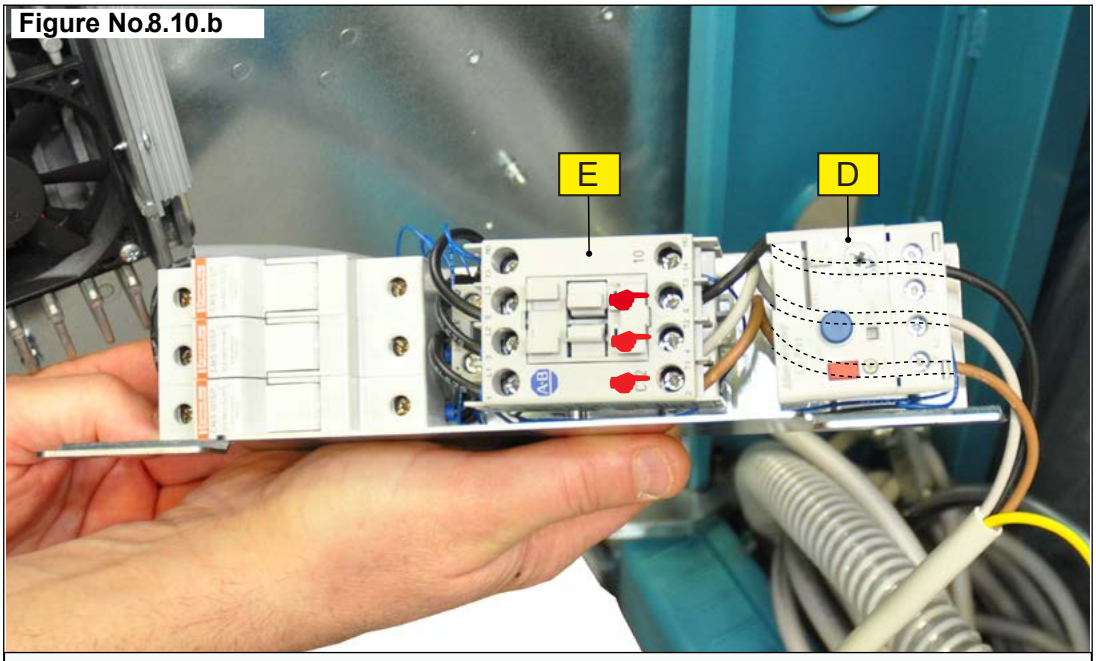
Figure No.8.10.a



Removing the contactor plate

1) Make sure the machine is switched off and the power supply cable is disconnected from the mains socket.
2) Open the electrical cabinet by moving the lever (A).
3) Loosen the 2 bolts (B1) and remove the guard (B).
4) Loosen the 2 bolts (C1) and remove the contactor plate unit (C).

Figure No.8.10.b

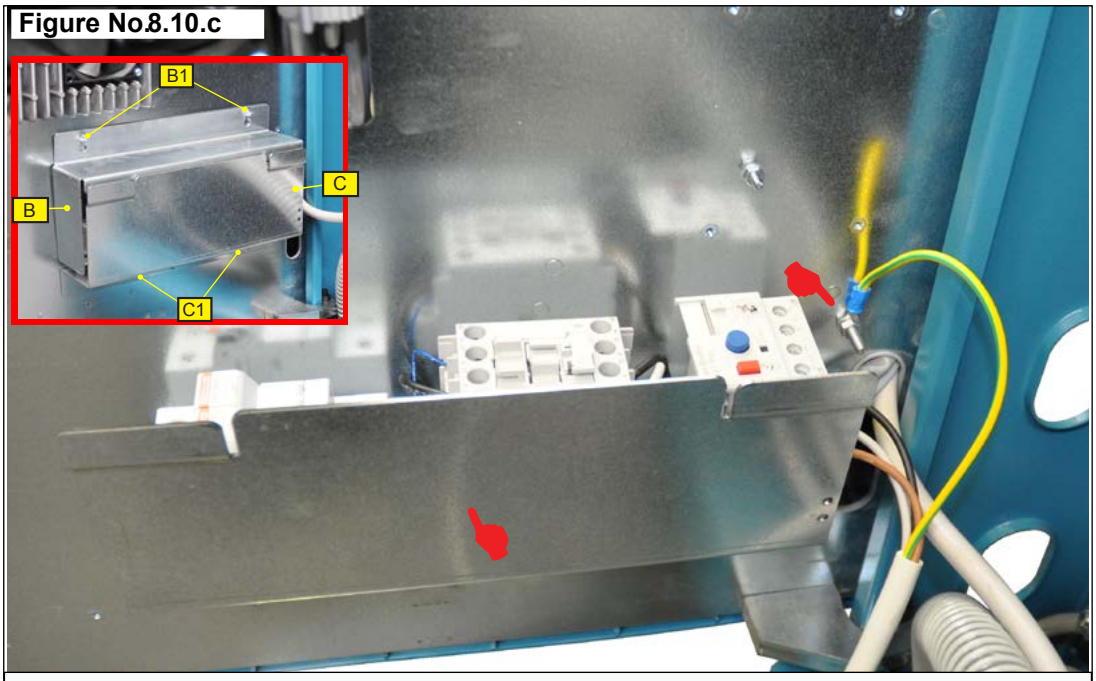


Making the connection through the relay (D)

5) Now, with the unit (C) disassembled, insert 3 wires of the fan power cable by passing through the relay holes (D) and connect them to the terminals of the contactor (E), regardless of their position.

6) The direction of rotation of the fan and its intake must be adjusted at a later stage, by reversing the wires directly on the fan terminal board, as outlined in this chapter under point 3, in the “Connection to mains supply” subsection.

Figure No.8.10.c



Refit the plate (C) and secure the earth cable

7) After connecting the power supply cable of the fan, reassemble the plate unit (C), by fixing it with the previously removed bolts.

8) Connect the green/yellow earth cable to the threaded pin as shown, and lock it in position with the bolt.

9) Reposition the cover (B) of the unit, by securing in position with the previously removed bolts.

8.11. CONNECTION TO THE MAINS SUPPLY

For correct electrical operation of the machine, before powering it on, the following checks must be performed:

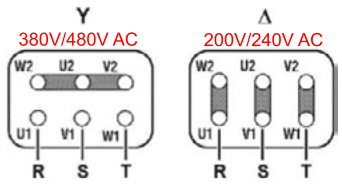
1) The local mains voltage and frequency must correspond to the values shown on the rating plate affixed on the righthand side of the base.

2) Check that the actual input voltage is within the nominal value +/-10%.

3) Connections to the terminal box of the electrical suction device motor must be as follows:
   - of the "triangle" type, when the mains voltage is equal to or less than 240V AC, as shown in the figure.
   - of the "star" type, when the mains voltage is equal to or less than 380V AC, as shown in the figure.
   - After restarting the machine, check the correct direction of rotation of the electric fan and suction from the cylinder bowl, and reverse the two R-T poles, if required.

Attention: Before performing any operations (checks, disassembly, etc.) on the electric suction unit (if any) and the related terminal board, switch off the machine completely, as outlined in the Use chapter in the subsection on switching off the machine.

Figure No.8.11.a



Connecting up the terminal board of the electric suction unit

4) Connection to the transformer inside the electrical cabinet must be on the correct mains supply voltage value.

Attention: Before performing any operations (checks, disassembly, etc.) on the transformer inside the electrical cabinet, switch off the machine completely, as outlined in the Use chapter in the subsection on switching off the machine, by disconnecting the power cable from the mains power socket.

5) The earth cable from the power mains, which is green/yellow to standard, must have a cross section of at least 2 mm² and be connected inside the electrical cabinet to one of the common earthing points (earthing screws) situated on the plate supporting the electronic equipment at the left top near the ON-OFF switch, in order not to expose personnel to any electric hazards caused by electric discharges resulting from contact with metal parts of the machine.

Attention: A connection is normally made between the neutral wire (central point of the three-phase line) and the earth cable in the main electrical cabinet in the place where the machine is installed; the neutral wire is not distributed in the power line consisting of 3 wires plus earth and there are some power lines in which the neutral wire is not connected to earth. In no case it admitted that the earth cable connected to the machine is also used for other machines or other electrical devices as an alternative to the neutral wire, not even when the cables are both connected each other in the main electrical cabinet.

Note: Earthing is also essential to shield some cables and electronic circuits in order to protect them from any electrical interference.

Carry out the checks and operations described above before connecting the power supply plug of the machine to the mains supply.

8.12. INSTALLING THE MACHINE SOFTWARE

Refer to the instruction handbook attached to the CD included in the supply of the machine for the installation of the machine software programmes.

Machine software updates can be obtained by completing the registration form and requesting a password on http://lonati.com , Support, Reserved Area, Registration Form.

9 SETUP

9.1. INITIAL MACHINE START-UP

The machine must be started up as follows:

1) Place the yarn reels correctly on the creel, taking care to thread the yarns through the appropriate guide rings up to the various flow control sensors and/or elastic feeders, if requested or present, as far as to the yarn fingers of each machine feeder.
2) With the machine switched off, perform the following safety checks:
   - All the identification labels must be affixed onto the machine and be clearly readable.
   - All fixed and mobile guards must be properly mounted and secured to the machine.
   - Machine safety devices, such as sensors and electronic or mechanical stops, should not be tampered with.
   - All the electrical parts in general must not be uncovered, damaged or inefficient, such as ducts, cables, cable sheaths and contacts.
   - All machine ventilation compartment and grilles must not be obstructed.
   - Tools and work equipment must not be left inside or on top of the machine to prevent them from falling among moving parts.
   - There must be no shavings of any type, fragments or residues of broken textile accessories on the machine or inside it.
3) Switch the machine on, by turning the main switch on the front door of the electrical cabinet to “I”.
4) With the machine switched on, perform the following safety checks, which must be match those outlined in the Operating Command chapter in the subsection on the external components of the electrical cabinet et the control panel:
   - Check the operation of the main ON-OFF switch on the front door of the electrical cabinet, in both positions “O” and “I”.
   - Check the operation of the START button on the control panel of the electrical cabinet.
   - Check the operation of the STOP button on the control panel of the electrical cabinet.
5) Check that all the yarn fingers involved in the execution of the desired article are properly fed with yarn.
6) Then, run the machine and launch the production a few socks to check the quality of the product.

9.2. RUNNING-IN

After the initial start-up described in the previous subsection, it is important to run in the machine with the desired article as follows:

- First week, press F5 in the machine display menu to set low speed (120rpm).
- Second week, press F6 in the machine display menu to set medium speed (170rpm).
- Third week, set the maximum speed not over 75% of the maximum speed allowed.
- Fourth week, set and maintain the maximum speed allowed for the machine model used, as outlined in the as outlined in the Technical Characteristics - Dimensions and Consumption chapter under the various subsections on performance admitted according to the various models described.

Attention: Following initial start-up, if flat parts, such as needles, jacks and sinkers, need to replaced due to wear following a set number of worked hours, the machine must be run in for 40 hours at low speed without knitting and then 48 hours at low speed executing the sock.

9.3. START OF PRODUCTION

As outlined in the previous subsection, during running in it is advisable to start the machine as follows:

7) Collecting the oil separately for 4 weeks as outlined in the Standard Maintenance chapter in the subsection entitled “Maintenance: cleaning the lubrication circuit for first machine start-up and replacement of the oil return filter”.

8) Before running the machine at the maximum steady rate it is important to check that the most suitable maximum speed values are programmed for the machine cycle, depending on the type of yarn being used, the desired width and type of mesh, within the maximum speed range.

10 MAINTENANCE WITH MACHINE OUT OF SERVICE

10.1. RULES FOR ANY MACHINE OUT-OF-SERVICE PERIODS

If the machine is left out of service for long periods (e.g. workers' leaves or other contingencies), the following measures must be taken:

1) Isolate the machine from pneumatic and electricity supplies, in accordance with the instructions outlined in the chapter on Additional Safety Rules for Machine Installation, Use and Maintenance in the section on the procedure for the isolation of the machine from pneumatic and electricity supplies.
2) Clear the needles of any scraps of yarn and/or knitted fabric.
3) Lubricate the cylinder area, needles and sinker cap, using the same oil grade use for the machine.
4) Remove any scraps of yarn from the suction hood on the cutter supporting unit.
5) Make the needles and dial jacks retract fully in their grooves.
6) Use a brush to spread a thin layer of grease on the cutter.
7) Thoroughly clear all the part of the machine of dust, yarns, any smudges, the residues of needles and other textile accessories, etc.

11 MACHINE DISMANTLING AND DECOMMISSIONING RULES

11.1. MACHINE DISASSEMBLY METHOD

If the machine needs to be dismantled, please contact the LONATI Technical Service.

11.2. HOW TO DISPOSE OF THE MACHINE

When the machine needs to be disposed of as it is replaced or removed, it is necessary to dispose of all the lubricants inside it in accordance with the laws and regulations in force in the country in which it is used.

Then the entire scrap must be disposed of only by a qualified company or body in possession of the required authorisation for dismantling and disposing of all the materials forming the scrap, in particular:

- Ferrous metals that have been painted, galvanized, burnished and have underwent other surface and heat treatments.
- Non-ferrous metals that have been painted and have underwent other surface treatments.
- Various plastic materials.
- Power cables, motors, various electric and electronic component parts.

The machine component parts must be dismantled and disposed of in accordance with existing legislation in the country of use. In this regard, LONATI recommends the user to verify in advance with the competent authorities of the country of use of the machine on the correct procedure for its scrapping and disposal of.

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