

**Instruction Manual**

**ENG**

## **Quick Six S2**



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9.024.02.US



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# CHAPTER 1

## BASIC NOTIONS

## 1. STRUCTURE

This manual consists of various chapters, each containing several points, paragraphs, etc. Lists may be contained in paragraphs.

- The page number is indicated in the top outer corner of the page.
- The chapter number and title are indicated in the top inner corner of the page.
- The model of the bar feeder is indicated in the bottom right-hand corner of the page.

### 1.1. Cross-references

Each chapter generally contains all of the information related to the description and settings of the devices and elements represented therein.

Therefore, if a setting must be made while you are handling the machine, please refer to the chapter on the device to be set, for example: (see chapter \*) or (see point \*).

### 1.2. Symbols and terminology



This sign recommends following the directions very closely avoiding causing an incident that could result in injury, damage to the equipment, or data loss.



This sign indicates that safety measures must be taken to avoid possible electrical shocks or mishaps.



The notes stress interesting points or comments, and provide useful advice for optimal machine operation.



This sign points out an advice about environmental protection.

## **2. RIGHTS**

All rights reserved. Reproduction, recording or transmission of all, or any portion, of this manual, in any form or through any means whatsoever, whether mechanical, photographic, audio or other, without the express written authorization of LNS, is prohibited. LNS accepts no responsibility for errors which may be contained in this manual and any problems which may result.

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The instructions found in this manual are only for information; they are subject to change without notice. LNS reserves the right to alter this information without prior notice.

### 3. "EC" DECLARATION OF CONFORMITY

#### "EC" DECLARATION OF CONFORMITY

As per annex II A of directive 2006/42/EC



We hereby declare that the following machinery is manufactured in compliance with the following directives:

- Machinery Directive: 2006/42/EC
- Low Voltage directive: 2014/35/EU
- EMC Directive: 2014/30/EU

Manufacturer:

**LNS SA**  
Route de Frinvillier  
CH- 2534 Orvin  
Switzerland

Technical file compiled by:

**Plaseco Kurt De Pauw**  
Route de Payerne 11  
CH- 1752 Villars-sur-Glâne  
Switzerland

Description of the machine

Automatic bar feeder

Type

: MOVE S2

Serial number

: (see number on official document)

The following essential requirements of the machine directive 2006/42/EC are applied and fulfilled :  
1.1.2, 1.1.3, 1.1.5, 1.1.6, 1.2.1, 1.2.2, 1.2.3, 1.2.4, 1.2.5, 1.2.6, 1.3.1, 1.3.2, 1.3.3, 1.3.4, 1.3.5, 1.3.6,  
1.3.7, 1.3.8, 1.3.9, 1.4.1, 1.4.2, 1.4.3, 1.5.1, 1.5.3, 1.5.4, 1.5.8, 1.5.9, 1.6.1, 1.6.2, 1.6.3, 1.7.1, 1.7.2,  
1.7.3, 1.7.4.

The following transposed harmonized standards have been used :

- Concerning the Machinery Directive :

- EN ISO 12100:2010 : Safety of machinery - Basic concepts & principles,
- ISO/TR 14121-2:2013 : Safety of machinery - Risk assessment,
- EN ISO 13857:2008 : Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs,
- ISO 14120:2002 : Safety of machinery - Conception of movable guards,
- EN ISO 13850:2006 : Safety of machinery - Emergency stop equipment,
- EN ISO 13849-1:2008 : Safety of machinery - Safety-related parts of control systems,
- ISO 14118:2000 : Safety of machinery - Prevention of unexpected start-up,
- EN 60204-1:2006+A1:2009 : Safety of machinery - Electrical equipment of machines,
- EN ISO 14119:2013 : Safety of machinery - Interlocking devices,
- EN ISO 4414:2010 : Pneumatic Power - Rules and Safety requirements,
- CEI 60812:2006 : Safety of machinery - FMECA Analysis

- Concerning the Low Voltage Directive :

- EN 61439-1:2011, EN 61439-2:2011, EN 61439-3:2012  
: Low-voltage switchgear and control gear assemblies

- Concerning the EMC Directive :

- EN 61000-6-4 : Generic emissions standard, Industrial environment,
- EN 61000-6-2 : Generic immunity standard, Industrial environment

Location and date:

**Orvin, November 28<sup>th</sup>, 2016**

Stamp and signature:

**Therese Plassmann**  
Manager Export Department



## 4. SAFETY INSTRUCTIONS

- Do not handle the equipment without having knowledge of the safety instructions and the instructions for use. Safety instructions for the bar feeder, as well as the CNC lathe, must be strictly observed.
- Non-qualified personnel, children, and persons under the influence of alcohol or medication should not handle the equipment.
- Loose garments, long hair and jewelry can be dangerous.
- Do not remove any covers while the bar feeder or the machine is under electrical power.
- Do not conduct any maintenance operations during the automatic cycle.
- Do not grasp moving or rotating objects, or nearby elements.
- If certain safety shields or safety covers are removed to conduct maintenance, they must be reinstalled as soon as the maintenance work is completed.
- No servicing should be carried out on the interface or inside the electrical cabinet while the bar feeder or the lathe is under electrical power.
- It is strictly prohibited to jump wire or remove circuit breakers, main switches, and especially safety switches.
- To avoid any harm to persons, or damage to components, use only the indicated points for lifting and moving the bar feeder. No one should be near the hanging load, or within the operating range of the overhead hoist/crane, forklift, or any other means used for lifting and transportation. Do not knock the bar feeder while moving it as this could damage it.
- Do not move the bar feeder while it is electrically powered on.
- The work area surrounding the bar feeder should always be clear of objects and well lit. The presence of oil on the ground could cause falls; it is important to maintain the floor clean on a regular basis.
- Do not place the machine in a damp area and make sure that water or oil does not come into contact with the electrical equipment.
- Do not open the clamping device (collet or chuck) of the lathe manually when the bar feeder is in automatic mode (Interface).
- Each time the diameter is changed, also adapt spindle reduction tube. The use of spindle reduction tubes is highly recommended for machining bars with diameters smaller than the maximum capacity of the spindle.
- Do not attempt to recharge the batteries of the PLC.
- For the use and maintenance of the bar feeder, use only parts provided by or recommended by LNS.
- If it is necessary to move the bar feeder once it has been originally installed, do not reinstall it before first contacting LNS or its local representative.
- The rotating bar should never protrude the rear of the lathe spindle.
- The maximum length (max. L) the bar feeder is allowed to load is given by the length of the lathe spindle. The bar should never extend more than 3 times its diameter beyond the lathe clamping device without support.
- LNS disclaim all responsibility for possible accidents or property damage caused when safety instructions are not followed.

## 5. SAFETY DEVICES

### 5.1. Description

The MOVE S2 bar feeder has been designed with a focus on maximum safety during its handling and complies with all EC requirements.

Safety covers and devices make access to the moving parts of the bar feeder impossible. Safety switches keep the bar feeder from operating when these protections are open.

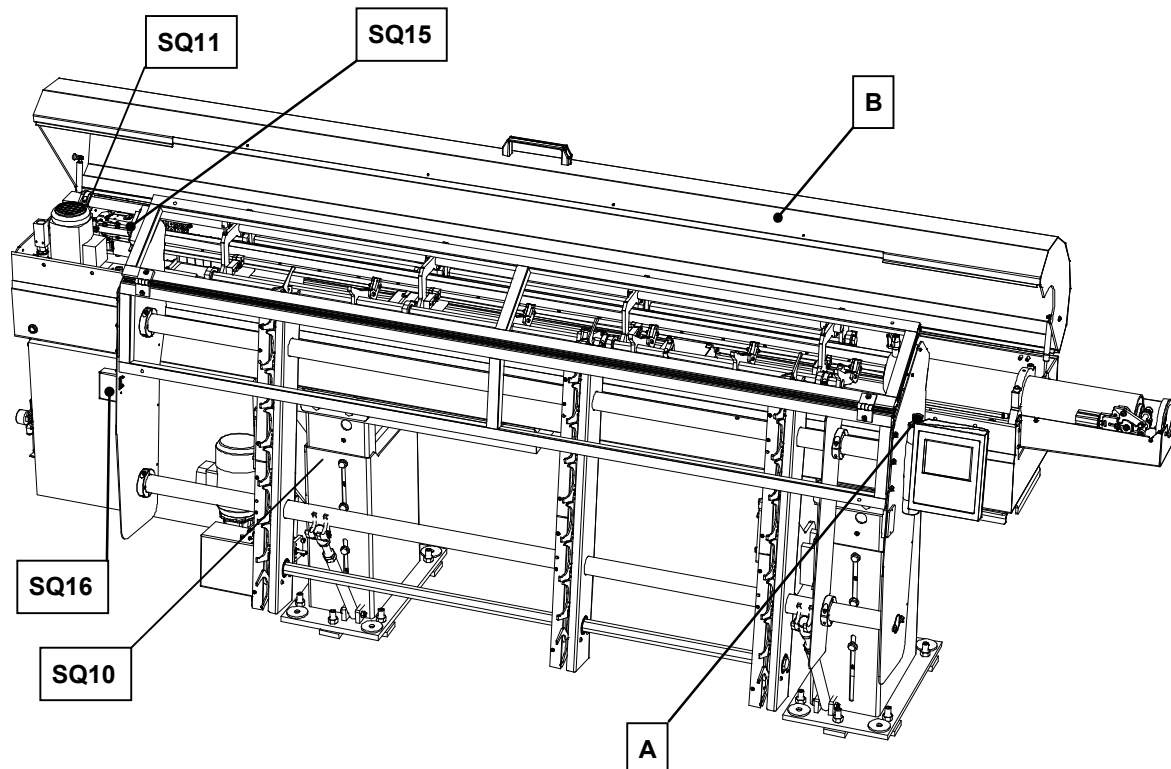
The design of the switches, as well as their insertion into the bar feeder, makes it practically impossible to bypass them.

By pressing the emergency stop button located on the remote control, the functions of the bar feeder and the lathe are immediately stopped.



LNS or its local representative, may not be held responsible for possible accidents or property damage, whether caused directly or not, by any means whatsoever, if certain safety devices have not been included.

### 5.2. Layout of the safety elements on the bar feeder



Designation	Description
A	Emergency stop push button (remote control)
B	Main access cover
SQ10	Safety switch of the retraction system
SQ11	Safety switch of the main access cover
SQ15	Safety switch of the safety grid
SQ16	Safety switch of the chain loader (optical cell)

## **6. FACTORS AFFECTING PERFORMANCE**

### **6.1. Installation**

The installation is a very important phase that, if neglected, could seriously impede the operation of the bar feeder.

#### **6.1.1. Distance**

The distance between the bar feeder and the lathe influences greatly the quality of the guiding. The further the bar feeder is from the spindle - and therefore, away from the clamping system - the larger the non-guided part of the bar will be.

It is essential that the mounting of the bar feeder is done in accordance with the instructions indicated in Chapter 3: Setting into operation.

#### **6.1.2. Alignment**

The guiding channel of the bar feeder serves, by definition, to guide the bar outside the lathe. Although the bar rotates in an oil bath inside the guiding channel, the alignment of the channel with the axis of the spindle must be perfect.

It is essential that the alignment of the bar feeder is done in accordance with the instructions indicated in Chapter 3: Setting into operation.

#### **6.1.3. Spindle length**

In some cases, the length of the spindle may influence the quality of the guidance.

### **6.2. Gap between the guiding elements and the bar**

The best results are obtained when the bar is guided with precision (2 mm). The greater the reduction of the clearance between the bar and the tube, the greater the rotation speeds will be.

When the clearance between the bar and the tube becomes too great, a rupture of the oil film occurs which results in the reduction of the rotation speeds permitted.

### **6.3. Gap between the spindle and the bar**

While the rear of the bar is maintained by front rest of the bar feeder and the front by the collet or the chuck of the lathe, it is possible for the portion of the bar inside the spindle to oscillate, if the clearance is too great.

It is, therefore, highly recommended to install reduction liner inside the spindle as indicated in the start up manual.

## **6.4. Material**

### **6.4.1. Bar stocks**

To obtain a perfect insertion inside the collet of the bar feeder, the bars must be chamfered concentrically (at the rear) at 30°. At the feeding process, it is recommended to deburr the bar at the front, to avoid possible catching during the introduction of the bar inside the spindle.

### **6.4.2. Tubes**

To prevent mixing the oil from the feeding process and the cutting oil from the lathe, it is recommended to put a plug in the rear of the tubes to be machined (see the start up manual).

### **6.4.3. Profiled bar stocks**

Round and hex bars are relatively easy to guide. Square bars or those with special profiles increase the risk of breaking the oil film.

### **6.4.4. Bar stock straightness**

Performances may vary, depending on the material machined, the length of the bar, etc. To obtain optimum output, the bars must be straight.

If the torsion of the bars exceeds 0.5 mm/m, performance will automatically be reduced in regards to speeds of rotation while vibrations will increase accordingly. In this instance, the quality of the guidance is not the cause.

### **6.4.5. Material composition**

In general, the difficulty increases with the specific weight of the bar. Steel bars are relatively easy to guide.

Because of their great flexibility and specific weight, brass bars are relatively difficult to guide at high speeds. Aluminum bars are very easy to guide.

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# CHAPTER 2

## TECHNICAL DATA

## 1. CHARACTERISTICS

	<b>MOVE S2</b>
Weight	700 kg
Overall length	3340 mm
Overall width	880 mm
Spindle axis height	900-1200 mm (*)
Z-axis retraction system	470 mm
Minimum diameter	8 mm
Maximum diameter (profiled: on flats)	ø80 mm hex 46 mm square 38 mm
Min. bar stock length	700 mm
Max. Bar stock length	1900 mm
Main electrical power (Volt)	3x 200-480 V, 50 Hz/60 Hz
Air pressure	5 bar
Air consumption	< 10 l/loading cycle
Maximum feed rate	> 100 m/min
Loading cycle time	30-40 sec.
Hydraulic oil	ISO VG 100

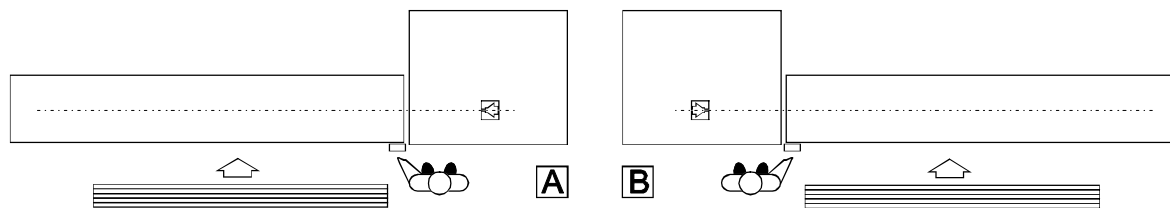
(\*) 1200 - 1500 mm with specific stand extension

Depending on the options, these technical data may vary. Please refer to the technical data sheet.

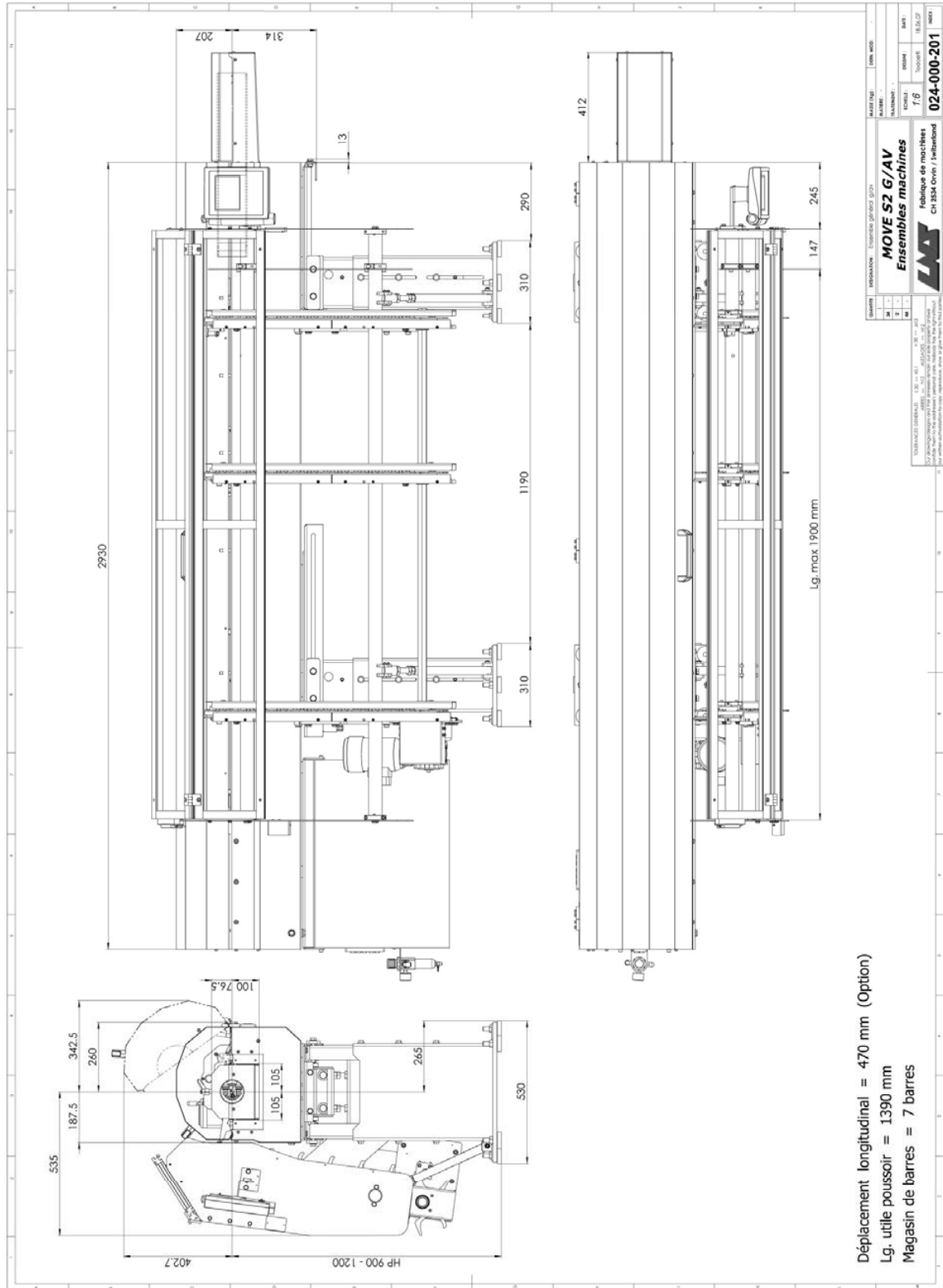
## 2. FLOOR PLANS

The following floor space plans indicate the most frequently used dimensions for placing the bar feeder. Details on the dimensions of other parts or elements of the bar feeder will be furnished upon request.

The plan (A) shows the MOVE S2 bar feeder with left/front loading.  
The plan (B) shows the MOVE S2 bar feeder with right/front loading.



## 2.1. Left/front loading

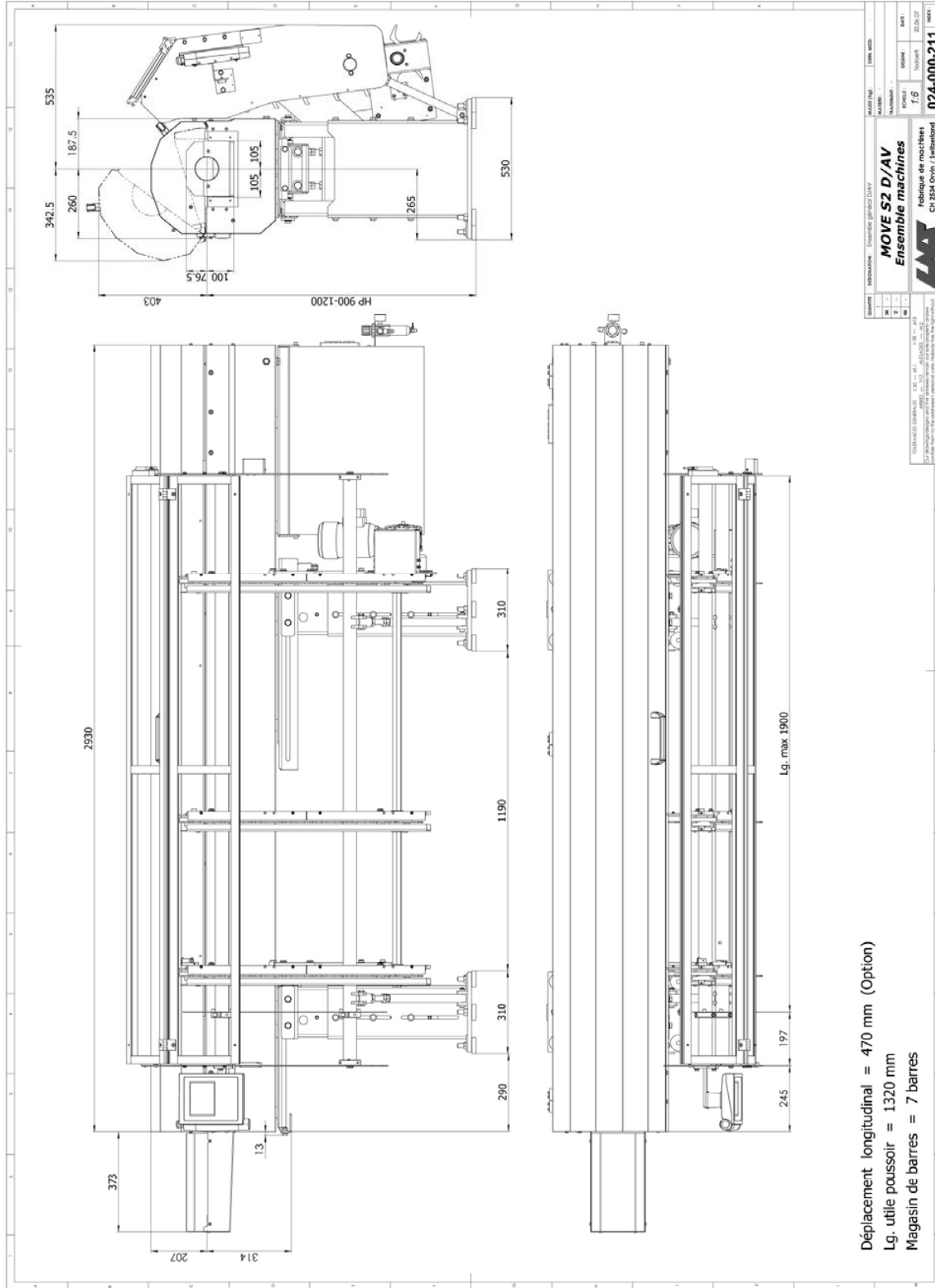


Déplacement longitudinal = 470 mm (Option)

Lg. utile poussoir = 1390 mm

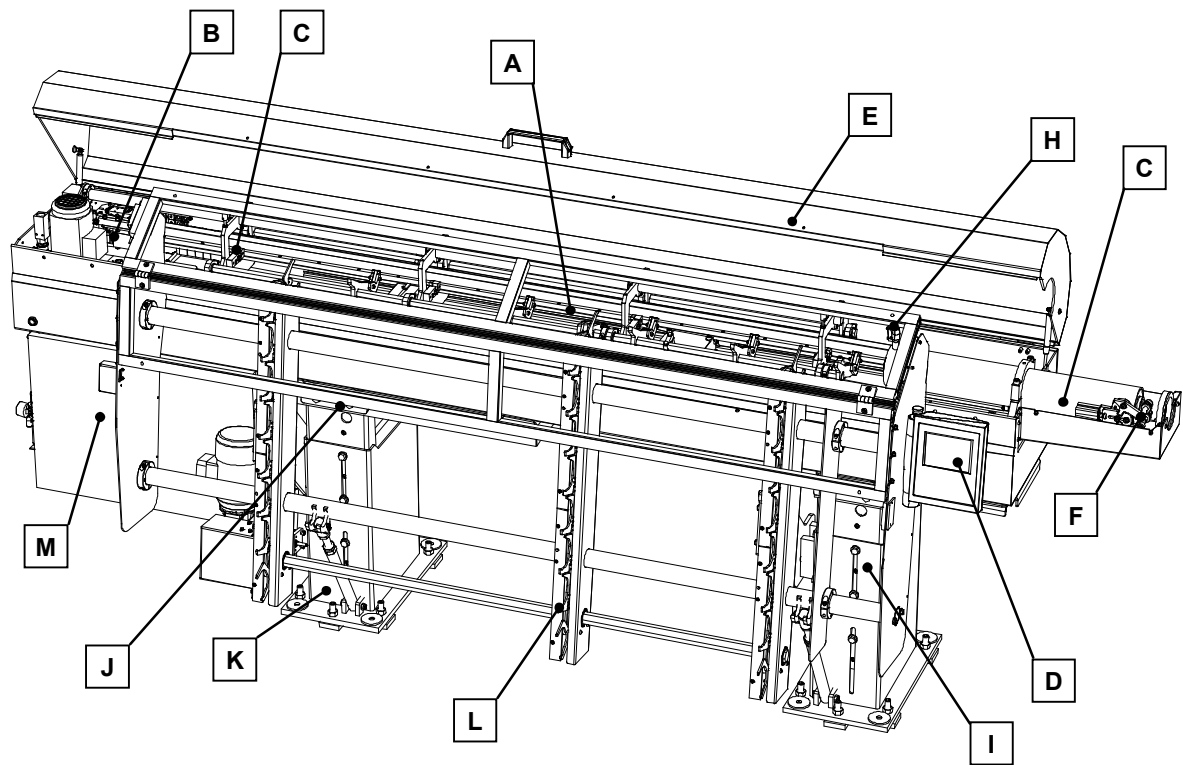
Magasin de barres = 7 barres

## 2.2. Right/front loading





### 3. LAYOUT OF THE ELEMENTS



Designation	Description
A	Pusher
B	Pusher belt drive
C	Pusher guiding element
D	Remote control
E	Main access cover
F	Pusher holding system
G	Interface plug (not visible here)
H	Measuring cell
I	Front stand
J	Retraction system
K	Rear stand
L	Bar stock chain loader
M	Electrical cabinet



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# CHAPTER 3

## SETTING INTO OPERATION

## 1. TRANSPORTATION



Please read the safety precautions described at the beginning of this manual before handling the following devices.

### 1.1. Description

Depending on its destination, the MOVE S2 bar feeder may be delivered either on a pallet, or packed in a wooden crate. When sea or air transports it, the second solution is recommended. Regardless of the type of packaging, the uncrating and lifting instructions recommended by LNS must be observed in order to prevent any injuries to persons and damages to objects. These instructions are stapled to the crate of the bar feeder.

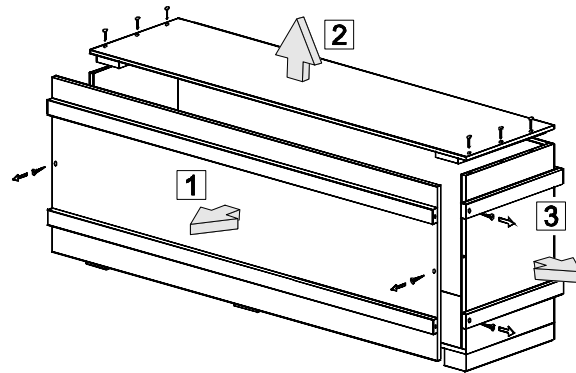
	Crate	Pallet
Width	1110 mm	1000 mm
Length	3800 mm	3800 mm
Height	1680 mm	1400 mm

### 1.2. Unpacking

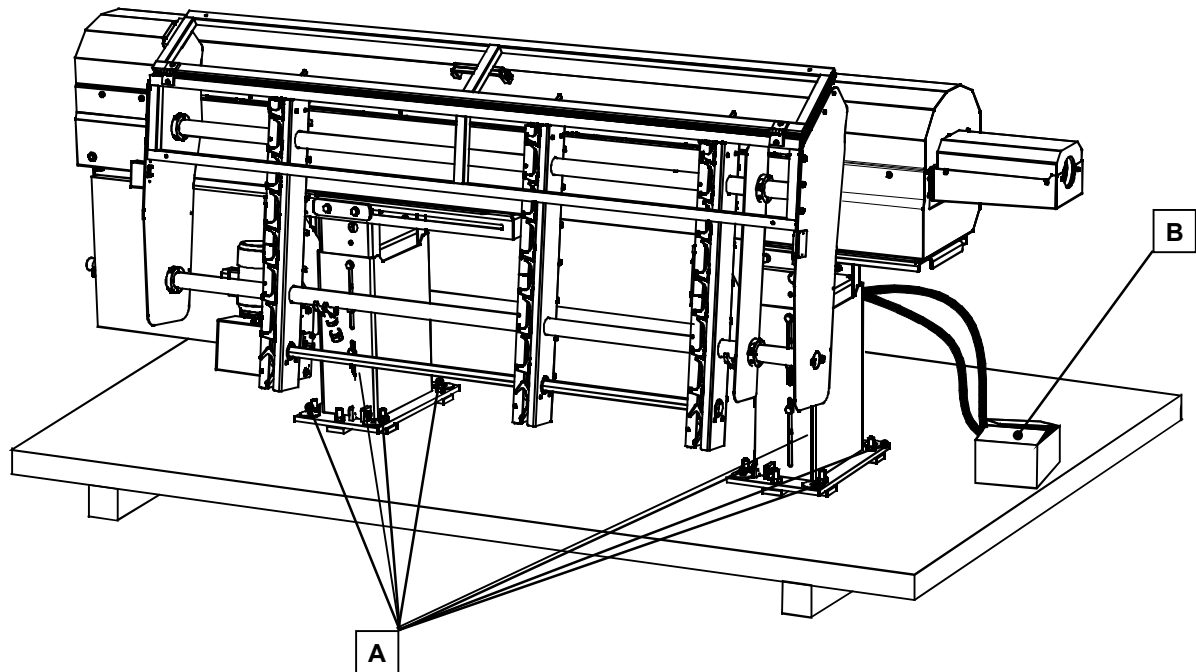


Check to see that the lifting capacity of the hoisting crane, or lift truck, is adequate before proceeding with the handling of the merchandise. No one should be near the hanging load, or within the operating range of the overhead hoist/crane, forklift, or any other means used for lifting and transportation.

- 1) If the bar feeder is received in a crate, start by unscrewing the front panel.
- 2) Remove the top.
- 3) Remove the side-walls.



From this point on, the bar feeder is unpacked in the same way as when delivered on a pallet.  
The MOVE S2 bar feeder is delivered as follows:



- The bar feeder is completely assembled and fastened to the pallet by 8 screws (A).
- The remote control and the interface plug are packaged in a separate box (B), with the technical documentation and the accessories.

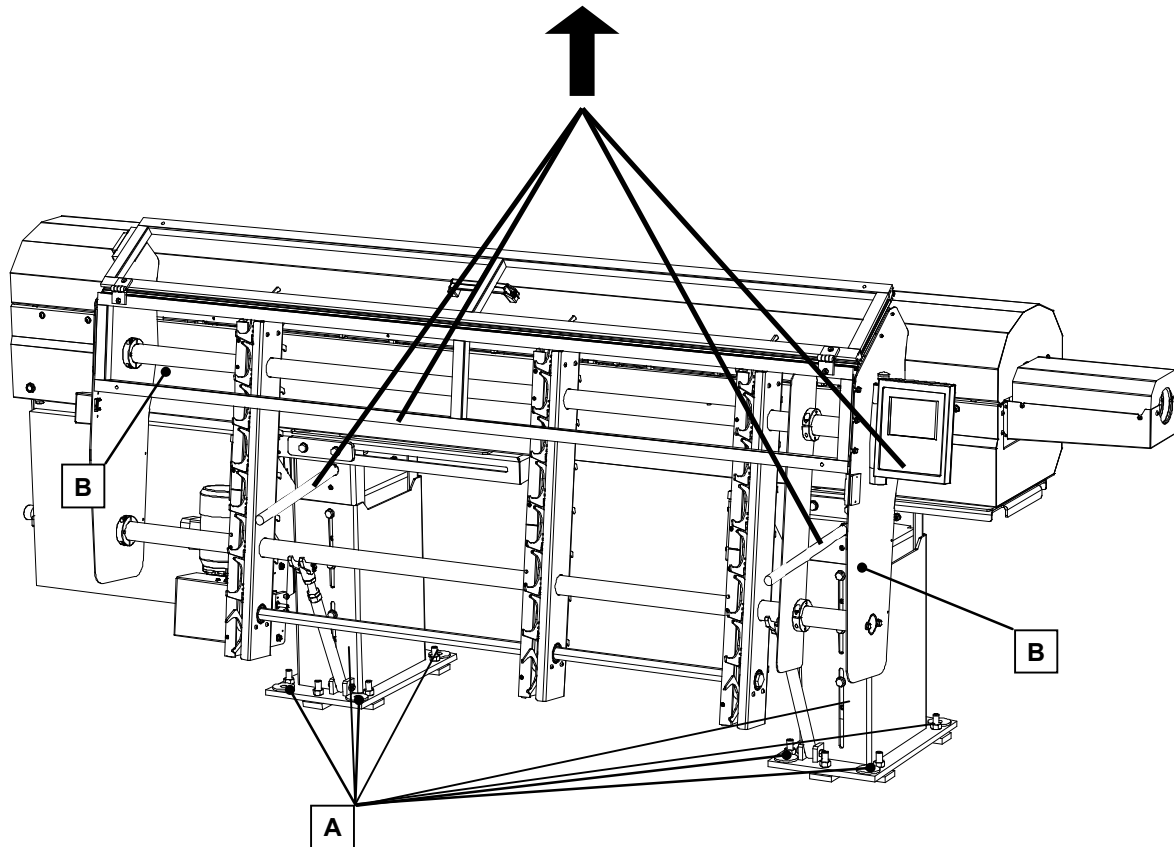
Take out the parts, and place them in an easily accessible area for mounting the bar feeder.

### 1.3. Preparation for mounting

For mounting and installing the bar feeder, it is advisable to contact LNS or its local representative. The latter cannot be held responsible for any malfunction resulting from an incorrect installation in which they did not take part.



- Insert the two bars (B) delivered with the bar feeder into the holes of the lifting plates.
- Place the hoist vertically above the bar feeder.
- Place the straps over the ends of the bars (B), and then attach them to the hoist.
- Raise the hoist to tighten the straps.



- Remove the screws (A) holding the bar feeder to the pallet during transportation.
- Lift the bar feeder and remove the pallet. Ensure that the bar feeder is balanced!
- Move the bar feeder, taking care that it remains horizontal and that no one is nearby or under the suspended load.
- Do not knock the bar feeder as you move it; this may damage it.
- Place the bar feeder behind the lathe, as close as possible and in approximate alignment with the spindle. For the placement, the stationary and mobile space requirements for the lathe and the bar feeder should be taken into account. When placing the bar feeder, insert leveling plates under the feet.



The distance between the lathe and the bar feeder should not exceed 20 mm. Should an obstacle impose a greater distance, contact LNS or its local representative. The area around the lathe and the bar feeder must be cleared to allow for their maintenance and handling. It should remain clear after the installation is completed.

## 2. MOUNTING

The bar feeder MOVE S2 is delivered totally assembled. Because of this, it is possible to proceed directly to its alignment when in place behind the lathe.

### 2.1. Alignment



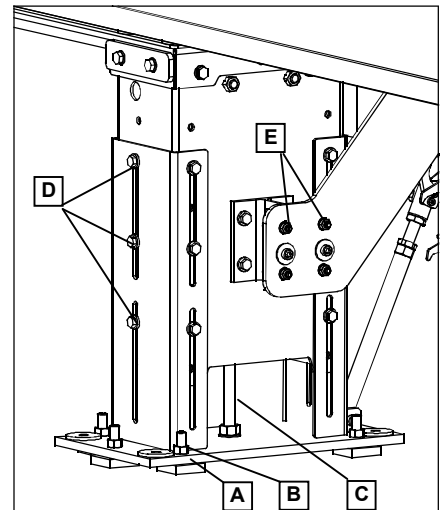
Before proceeding with the alignment of the bar feeder, ensure that the lathe is stable and preferably leveled. The bar feeder must be placed as close as possible to the lathe's spindle.



*During the alignment, ensure that there is no reduction unit in the spindle (spindle liner).*

The alignment may be carried out using a nylon string, an optical tool, etc. If you do not have any alignment tools, contact LNS or its local representative so they may take care of the bar feeder installation.

- On each foot, loosen the lock nuts (A) of the leveling screws (B). Then, make sure that the weight of the bar feeder is evenly distributed over the 12 support points.
- Loosen the nuts and locking screw (D) and make sure that the central screws (C) of the front and rear feet are supported.
- Open the guiding channel and place the level crosswise on the lower part. Adjusting the screws (B), set the lateral level.
- Adjusting the central screws (C), set the height of the bar feeder. Normally, when the reference point is known, this adjustment is done at the factory.
- Don't forget to adjust the supporting screws of the bar magazine (E).
- Together with the vertical alignment, proceed with the lateral alignment, by shifting the apparatus. If you don't have the needed material to perform this operation, please contact LNS or its local representative.
- When the alignment is satisfactory, tighten all locking screws (D). Check the alignment and, if necessary, correct it with the screws (B).



*The lock nuts of the leveling screws should only be tightened after the bar feeder is anchored to the ground.*

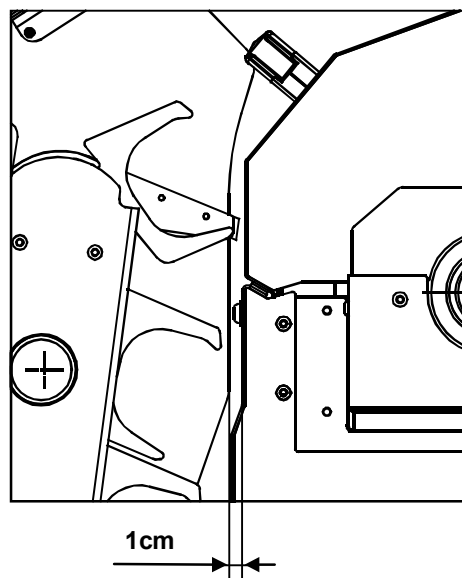
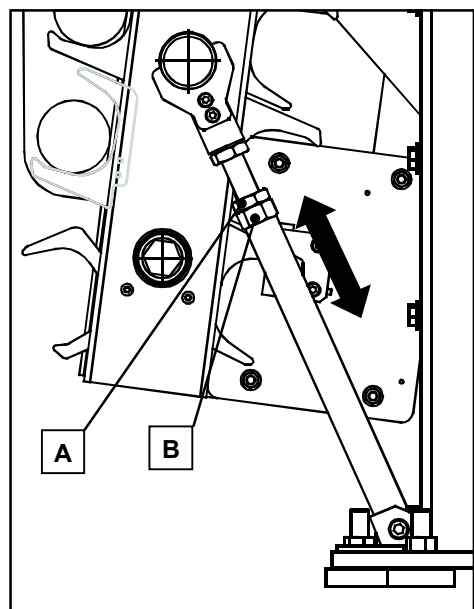
## 2.2. Chain loader supports setup

The bar feeder is set at factory to the axis height of the lathe to equip with. If a different setup is required, please proceed as follows:

- Two different supports are available, depending on the axis height to reach :

Axis height [mm]	Support
900 -1000	055-008-014
1000 -1200	055-008-024

- Loose the nut (A).
- Set the nut (B) to make sure the chain loader lays on the support.
- Check that a 10 mm gap remains between the chain loader side plates and the main access cover. The cover must be opened freely, without scratching against the chain loader hooks.



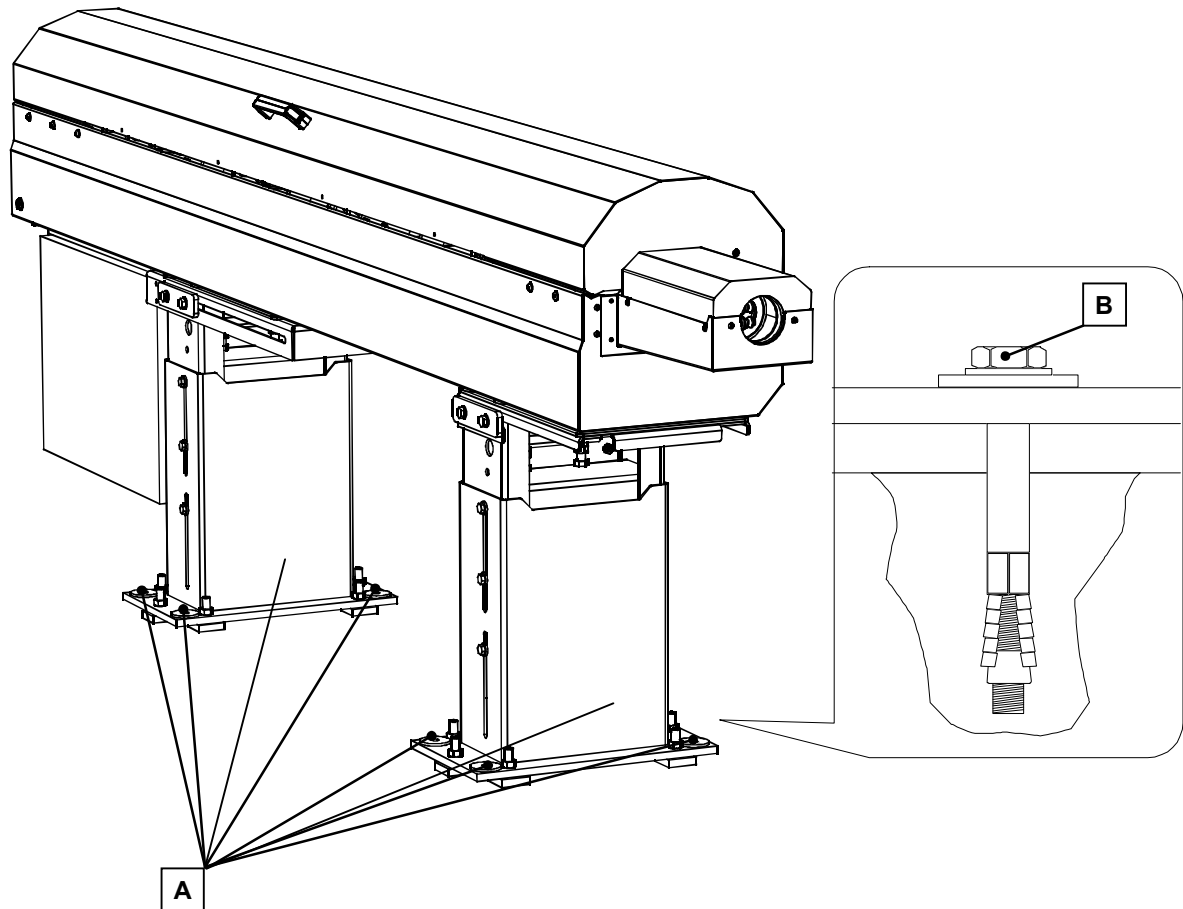


### 3. ANCHORING TO THE GROUND

Once the bar feeder is in place, and perfectly aligned, it should be anchored to the ground to make it stable. To accomplish this, 8 anchorage points (A) have been provided.

8 anchorage bolts (B) must be furnished by the client (min. M10 x 100 mm / 1/2" x 4").

- Once the anchoring bolts are tightened, check the alignment again, and correct it if necessary.
- Tighten the nuts of the leveling screws.



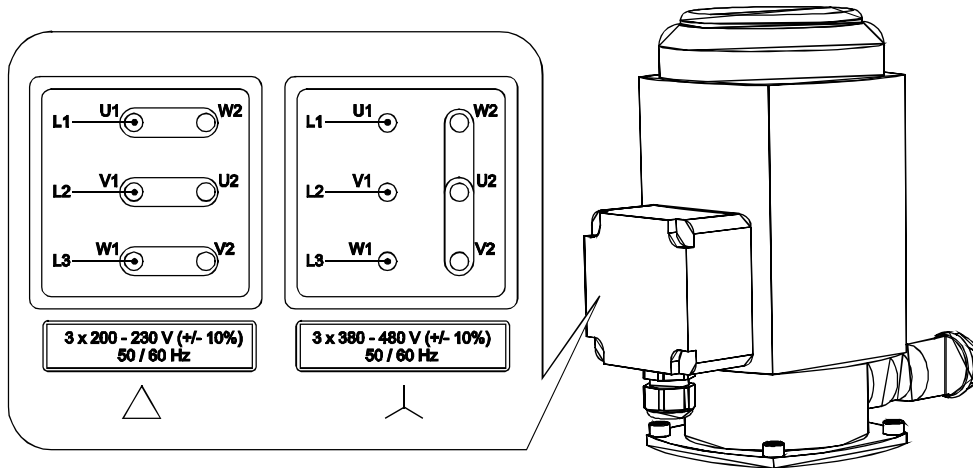
## 4. HYDRAULIC PUMP MOTOR CHECK



Particular attention should be given to the handling of electrical elements because of risks of electrocution. In case of possible electrical malfunctions, it is advisable to contact LNS or its local representative. It is strictly prohibited to make adjustments as long as the bar feeder is under electrical power. The adjustments of the electrical equipment must only be performed by qualified personnel.

During the installation, ensure that the motor is wired in accordance with the supply voltage available. The supply voltage of the bar feeder is indicated on the identification plate (point 4).

If the voltage does not correspond, the wiring of the motor must be modified:



Procedure:

- Turn the bar feeder off (trigger QS1 and QM1, see below).
- Open the main safety cover.
- Unscrew the motor cover unit.
- Make sure that all motor terminals are off.
- Modify the terminal block wiring of the motor according to the diagram above.
- Close the cover unit of the motor and the main safety cover.
- Turn the bar feeder on (engage QS1 and QM1).

## 5. FILLING THE HYDRAULIC TANK

The bar feeder is delivered without oil.

When the bar feeder is aligned and anchored to the ground, fill the hydraulic tank.

Put oil directly in the hydraulic tank.

Quantity : 60 l (17 gallons)  
 Viscosity : ISO VG 100 100 mm<sup>2</sup>/s (cSt) à 40°C

Consult your supplier who will recommend the correct oil for you.



*Dispose of waste used oil properly in an environmentally friendly way, and according to your local regulation.*

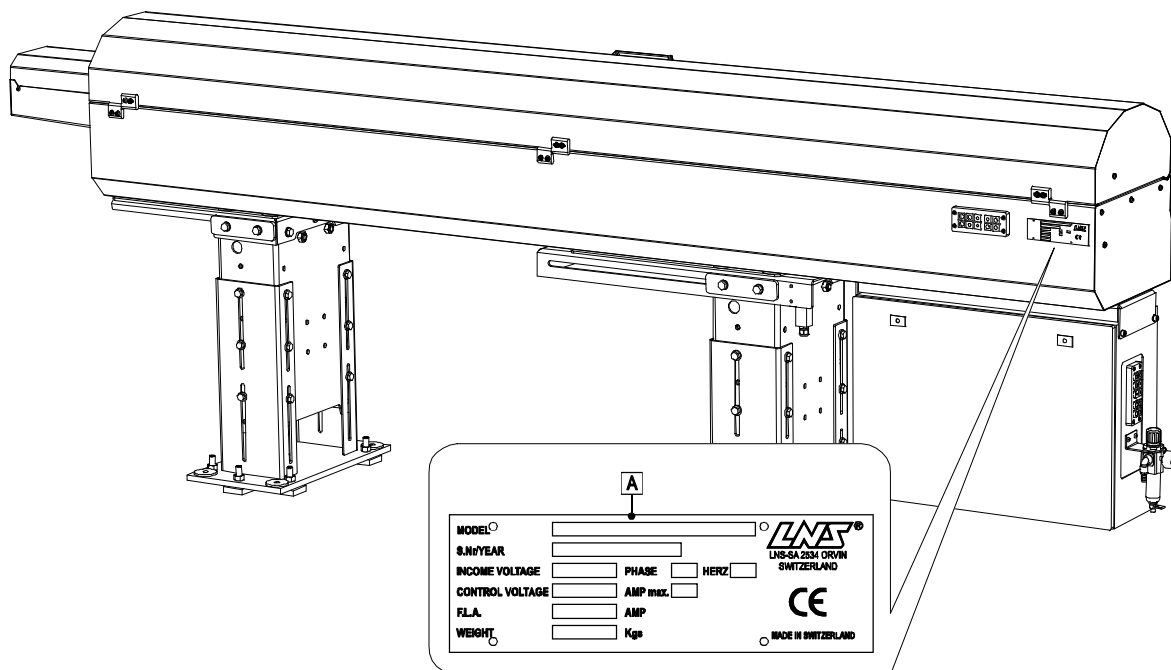
## 6. CONNECTION TO THE COMPRESSED AIR

To guarantee an optimal operation of the bar feeder, a minimum pressure of 5 bar (75 psi), and a maximum pressure of 6 bar (90 psi) is mandatory.

## 7. INTERFACE



Before turning the power on, check that the voltage of the bar feeder corresponds to that of the lathe. The voltage of the bar feeder is indicated on the identification plate.



The interface cable(s), between the bar feeder and the lathe is (are) provided by LNS.

Although an example of an interface diagram is provided, the diagram for the interface corresponding to your device, essential when making the electrical connection, is located inside the electrical cabinet. When making connections, ensure that the cables are long enough to allow the entire travel of the retraction system (470 mm).

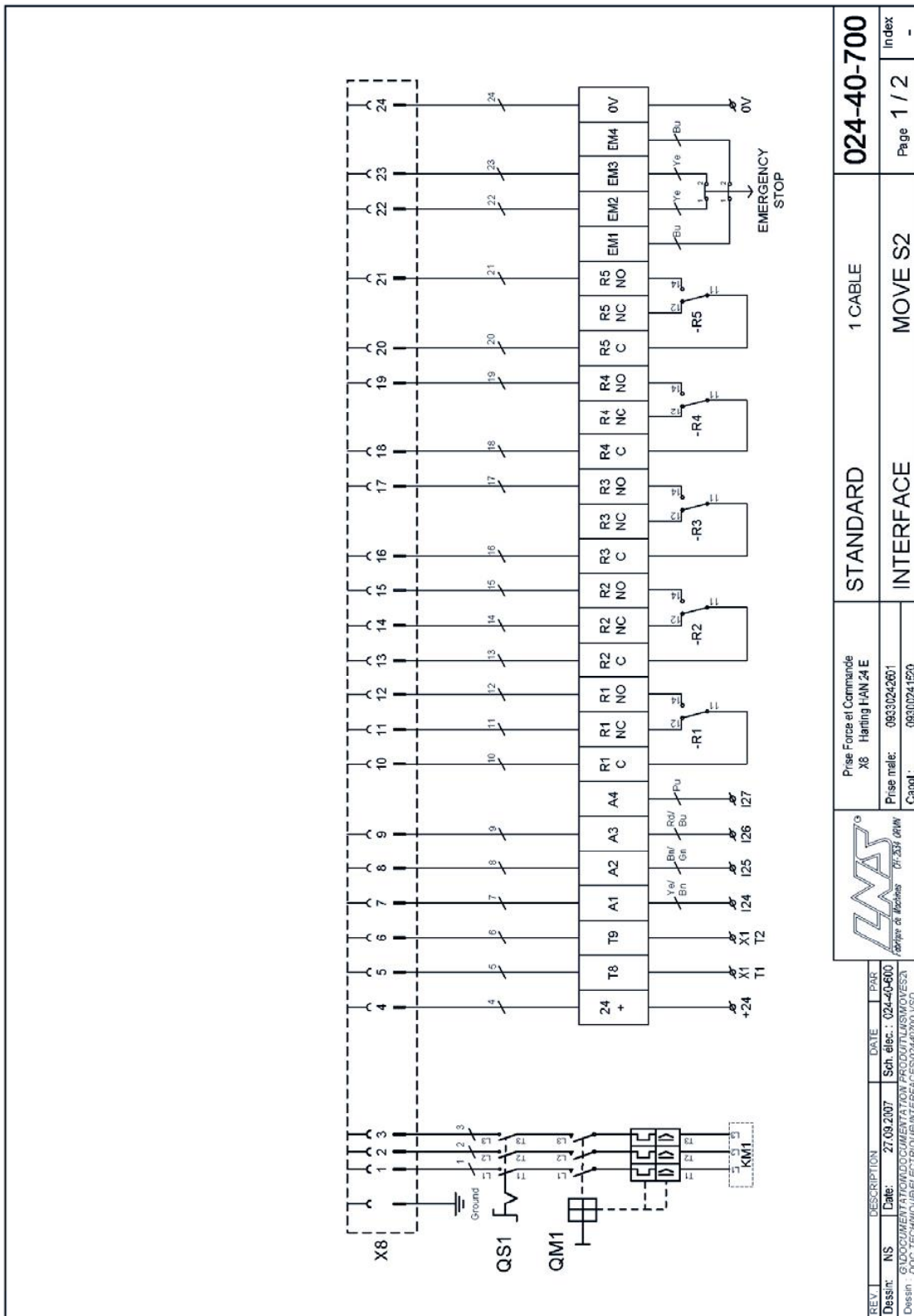


Should the interface instructions not be observed during the setting into operation, the damaged elements as well as the resulting damages are not covered by warranty.

### 7.1. Interface

The inputs and outputs designation of the interface on the PLC are indicated in chapter 5. Maintenance, section 3.6.

The interface diagrams below are provided as examples. The diagram corresponding to your bar feeder is located in the electric cabinet, with the electric diagram.



## 7.2. Connections

### 7.2.1. Power supply

Voltage: 3x 200-480 V, 50 Hz/60 Hz

Maximum voltage: 3 x 220V = 3 A  
3 x 480V = 1.5 A

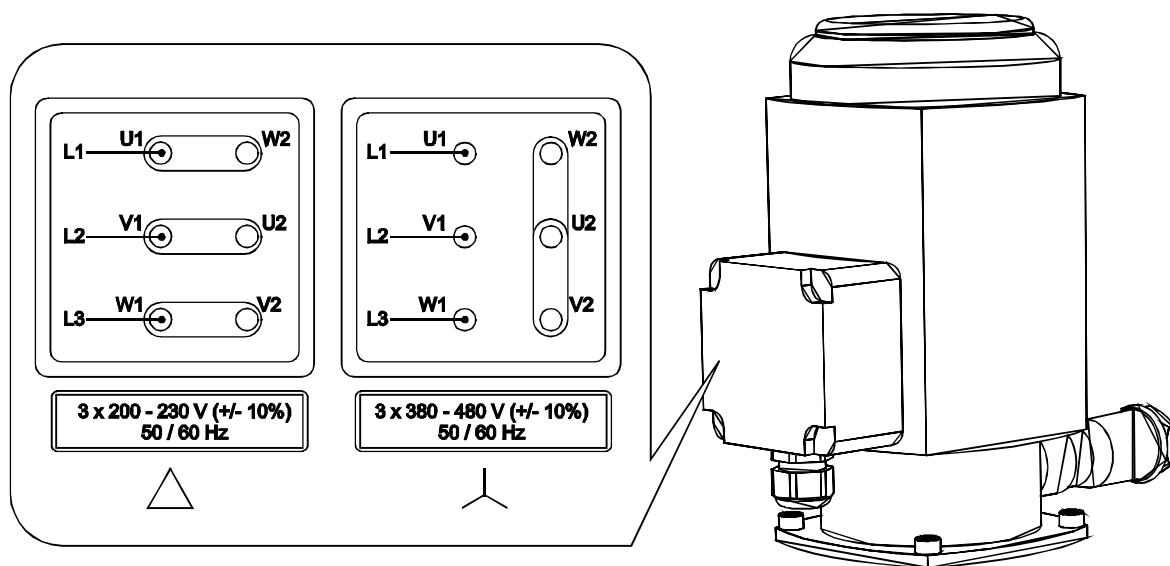


Before connecting, check to make sure that the voltage of the bar feeder corresponds to the one provided by the lathe. The voltage of the bar feeder is indicated on the identification plate.

The LNS bar feeders are equipped with their own thermal protection systems (breakers, thermal relays and fuses, etc.). The power supply for the bar feeder should be connected to the output of a breaker mounted in the electrical control box of the lathe (10 A max.).

For the wiring inside the lathe, the section of the cables should be at least 1.5 mm<sup>2</sup> (AWG 16).

If the voltage does not correspond, the wiring of the hydraulic pump motor must be modified:



#### Procedure:

- Turn the bar feeder off (trigger QS1 and QM1, see below).
- Open the main safety cover.
- Unscrew the motor cover unit.
- Make sure that all motor terminals are off.
- Modify the terminal block wiring of the motor according to the diagram above.
- Close the cover unit of the motor and the main safety cover.
- Turn the bar feeder on (engage QS1 and QM1).

### 7.2.2. Signals from the lathe to the bar feeder

Always refer to the electrical diagrams shipped with the bar feeder and placed in the electrical cabinet.

- All wires for interface connections are numbered
- All bar feeders are equipped with a power supply of +24 VDC.

#### a) 24 VDC power supply

Corresponds to the +24 V of the bar feeder. This power shall be used to connect the signals from the lathe to the PLC.

- All signals from the lathe to the PLC shall be powered by the +24 VDC of the bar feeder.
- All signals from the bar feeder to the lathe shall be powered by the +24 VDC of the lathe.

For the other types of connections, please contact LNS, or their local representative.

#### b) "EMERGENCY STOP" signal of lathe XT8-XT9

This signal is part of a safety link (Emergency Stop circuit) of the bar feeder. XT8-XT9 corresponds to the Emergency Stop signal of the lathe. If the circuit is open, the bar feeder will go into an Emergency Stop mode.

When the lathe is in an Emergency Stop mode, or if the safety line of the bar feeder is interrupted, an alarm will go off and the R1 relay of the bar feeder will be triggered (see description of the R1 relay, below).

#### c) Lathe clamp signal (PLC input A1)

This signal is for checking the mode of the lathe clamping device (open), and is mainly used for the feeding of a part, which takes place each time the clamp opens.

For safety reasons, wire a normally open contact, coming from the signal of the lathe clamp. A **clamp open** signal must be selected.

#### d) Lathe in automatic cycle (PLC input A2)

This signal indicates that the lathe is in automatic cycle.

#### e) Load command (PLC input A3)

Should the lathe be equipped with a sub-spindle or of a Swiss type, should the part require multiple feeds, this signal will be used as a load command from the lathe.

For safety reasons, and to prevent collisions between the part being transferred to the second spindle and the newly loaded bar stock when there is a simultaneous loading, the lathe must control the loading of a new bar.

#### f) Feeding pusher control (PLC input A4)

This signal orders the forward movement of the feeding pusher and the bar, independently of the mode of the lathe clamp.



As long as this signal is present, the signal of the foot switch to open and close the clamping device of the lathe must be locked. The lathe should not start up in automatic cycle as long as the clamping device does not grip the bar.

### 7.2.3. Signals from the bar feeder to the lathe



When the bar feeder is in alarm mode, the feeding pusher control signal should also de-energize.

#### a) R1 alarm relay

When the bar feeder is in normal operation, the R1 relay signal is energized. In the event of an alarm or break in the emergency stop circuit, this relay is de-energized.

For safety reasons, this signal should bring to a stop all of the axis movements of the lathe as well as the rotation of the spindle.

#### b) R2 start and stop of the lathe

Either: - Confirmation of the feeding pusher forward command  
And/or - Confirmation of the loading of a new bar

After the loading and positioning of the new bar on the lathe spindle, relay R2 confirms the end of the loading cycle or the part feed out.



The operational cycle of relay R2 (pulsed, latched, etc.) is controlled by Services parameters.

#### c) R3 end of bar signal relay

When the feeding pusher reaches the End of Bar position, relay R3 energizes. This signal is used to indicate to the lathe that there is not enough material left to make another part. The CNC must jump into a sub-program to allow the remnant to be dejected.



The operational cycle of relay R3 (pulsed, latched, etc.) is controlled by Services parameters.

#### d) R4 spindle interlock relay

This signal is present as soon as the bar feeder is in automatic cycle (Aut + Start).

#### e) Emergency stop button of the bar feeder (EM1-EM2)

When the Emergency Stop button is pressed, the contact opens. The lathe must be in Emergency Stop mode, and the feeding pusher signal from the lathe must turn off. Two normally closed contacts of the Emergency Stop button are available for connection in the Emergency Stop circuit of the lathe.

### 7.2.4. Options

The options described below are an integral part of the standard equipment of the LNS bar feeders.

These signals, however, are not required for the proper operation of the devices, or the safety locking for protecting persons and materials. The options are available only to optimize production conditions.

#### a) R5 auxiliary end of bar relay

This signal may be used to reduce the length of the remnant in case the remnants exceed the maximum admissible length for the parts catcher of the lathe or its chip conveyor. Relay R5 energizes as soon as the feeding pusher reaches the programmed position.

#### b) R10 bar stock magazine empty relay

Contact of relay R10 (optional). Relay R10 engages after verification of the presence of a bar during the loading cycle of a new bar.

### 7.2.5. Recapitulation of safety instructions related to the interface

- The lathe foot switch for opening the lathe clamping device should not be operational during the automatic cycle of the lathe.
- The lathe pedal should not be operational as long as the feeding pusher feed command signal is present.
- Whenever possible, it is advisable to interlock lock the manual command for opening the lathe clamping device while the feeding pusher command signal is on.
- If the lathe is in the Emergency Stop mode, the bar feeder must also be under the Emergency Stop mode, and vice-versa.
- If the bar feeder generates an alarm, the lathe must go into alarm mode. The feeding pusher feed command signal must go off, the spindle axis and rotation must stop.



# CHAPTER 4

# OPERATION

## 1. POWERING ON/OFF

The motor for the bar feeder is equipped with a built-in absolute encoder that continuously controls the position of the pusher.

When the bar feeder is switched off or there is a power failure, this position is kept in the memory by the amplifier.

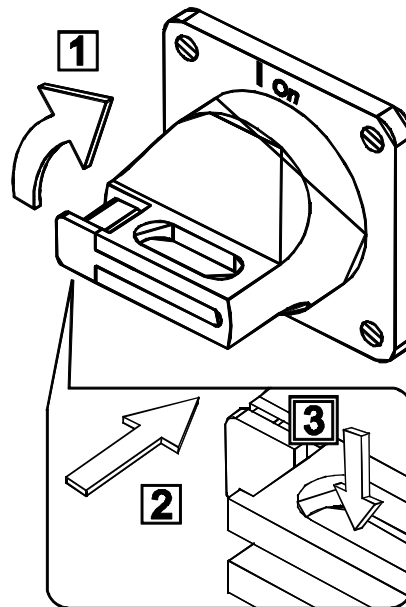
When powering on, the value saved is immediately taken into account, thus avoiding any referencing position. The status parameters saved in the PLC prior to powering off are then checked by the PLC which analyses them. The latter then gives the operator access only to those handling operations that can be undertaken.

To power up the bar feeder, turn (1) the switch clockwise, to the I/ON position.

To power off, turn the switch anticlockwise, to the O/OFF position.

The master switch can be locked with a padlock. This means it is impossible to switch the bar feeder on.

Push (2) the locking mechanism and insert (3) the padlock into the opening. Lock the padlock.



### NOTICE

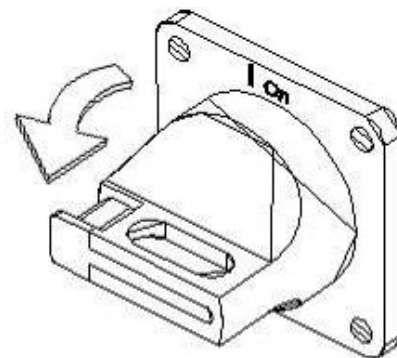


#### **Material damage!**

Damage to the feeder!

Before any handling, ensure the lathe has completed the piece.

To power off, turn the switch to the left, to the O/OFF position.

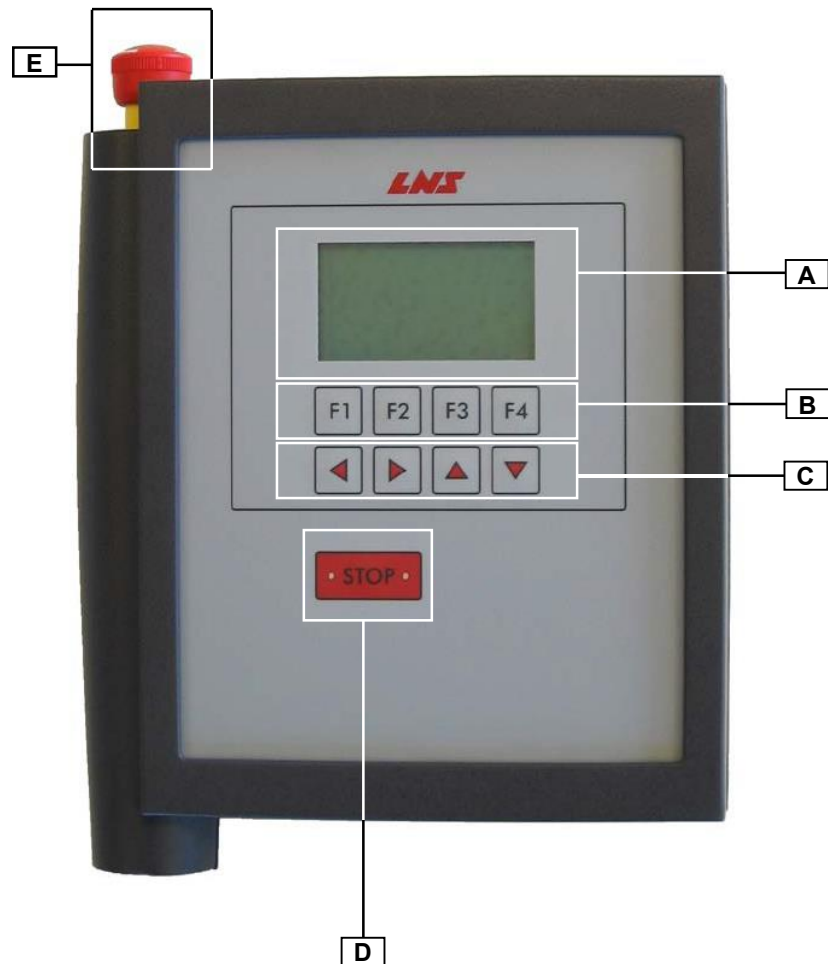


## 2. REMOTE CONTROL

The ergonomic and user-friendly remote control with a clear built-in display facilitates the handling of the bar feeder. Depending on the sequence under way, the bar feeder gives access only to those functions which are available, thus avoiding any incorrect handling, and reducing the access time to the necessary functions.

The display reads, continuously and clearly, the status of the bar feeder and the production, allowing one to verify at all times the functions, diagnostics, error signals, or their analysis. The most recent error signals are saved in a register and can be recalled to establish the diagnostics.

The remote control has five distinct segments, namely: display (A), function keys (B), left/right/up/down keys (C), STOP key (D) and the emergency button (E).



## 2.1. Display

The liquid crystal display provides the operator with all the necessary data, both for handling the bar feeder and for maintenance.

- The upper portion of the display has eleven lines and is reserved for the reading of text. Error messages are usually displayed with their diagnostics.
- The lower portion of the display is reserved for the display of icons. The icons indicate to the operator which functions are attributed to keys **F1** through **F4**.

The icons available are the following:

Icon	Signification	Icon	Signification
	Referencing position		Set up
	Switch to automatic mode		Escape
	Stop after machining one bar stock		Return to previous menu
	Switch to manual mode		Jump to next menu
	Pusher forward (picture may be reversed)		Load a bar stock in the guiding elements
	Pusher reverse (picture may be reversed)		Confirm the unloading of a bar stock out of the guiding elements
	Validate		Cancel
	Automatic Top-Cut positioning in manual mode (picture may be reversed)		Teach data
	Extract the bar out of the clamping device of the lathe (picture may be reversed)		Offset correction
	Confirm. In setup mode, the button must be hold for 3 seconds to validate the change.		Increment data in offset correction mode
	Start sequence		Decrement data in offset correction mode
	Closing bearing support pusher		Opening bearing support pusher
	Change guiding elements		Validation for the changes of guiding elements
	Validation for the return position of the fingers once the guiding elements positioned		

## 2.2. Function keys F1 - F4

These keys are located right below the display. The functions attributed to them are indicated on the display by icons.

As the operator advances in the handling, the functions of the keys are automatically reattributed.

The risk of error in handling is therefore virtually reduced given that the proposed functions always correspond to the circumstance and availability of the bar feeder.

## 2.3. Left/right/up/down keys

These keys allow to enter values (bar stock diameter, part length, etc.) or parameters.

When an enumeration of parameters or menu sets is proposed, these keys allow the selection.

## 2.4. Emergency stop switch

When a dangerous situation arises, pressing the emergency stop switch interrupts immediately all bar feeder and lathe functions (if interface is wired accordingly).

To cancel the alarm, release the switch by rotating its red knob counter-clockwise, then press [STOP].

## 2.5. STOP key

The STOP key allows interrupting the sequence under way.

**Important: the automatic cycle of the lathe must first be interrupted.**

By pressing the STOP key, allows to exit the setting mode, regardless of the level reached, and to return to the work screen.

### 3. SET UP

#### 3.1. Bar feeder mechanical setup

##### 3.1.1. Retraction device

To facilitate these tasks, the MOVE S2 can be equipped with a retraction system, which allows the operator to move the bar feeder. The rigidity of the system guarantees a perfect alignment when the bar feeder is in working position. A safety switch impedes any handling as long as the bar feeder is not in operational position.

A safety switch impedes any handling as long as the bar feeder is not in operational position.



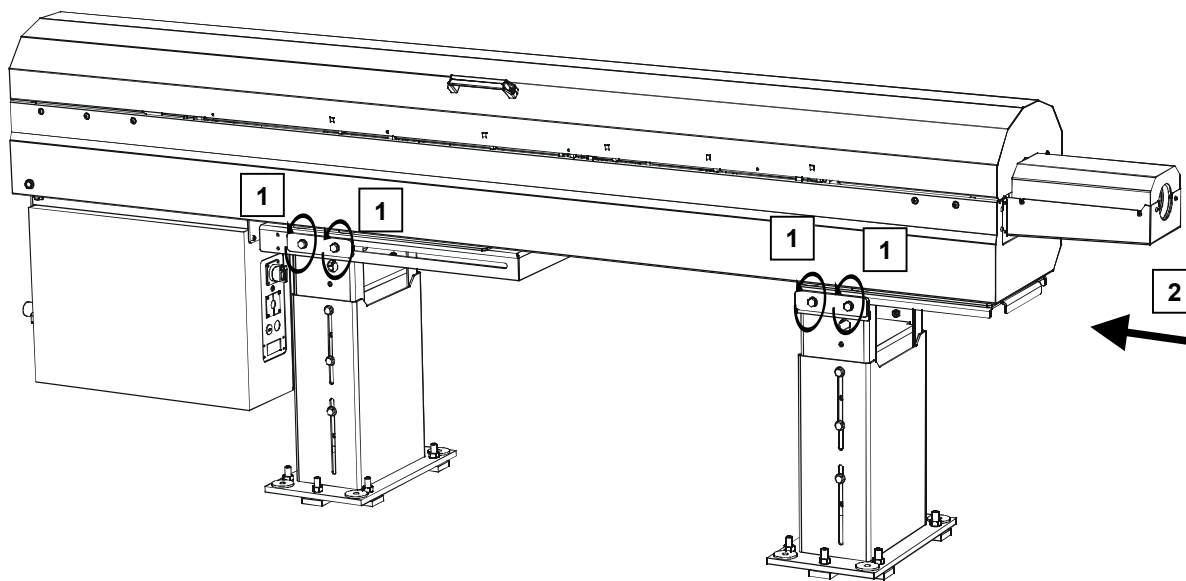
It is strictly prohibited to use the retraction system before the bar feeder is anchored to the ground. Please read the safety precautions described at the beginning of this manual before handling the following devices.



Before handling the retraction mechanism, check to see that the interface cables between the spindle and the bar feeder are long enough.

##### Conditions:

- Bar feeder in STOP mode.
- No bar between the bar feeder and the lathe
- Pusher inside the bar feeder
- The area around the bar feeder must be clear



##### Procedure:

1. Loosen the 8 lock screws (2x4).
2. Pull the bar feeder back.
3. After completing the maintenance operations, bring the bar feeder back in working position, lock the screws.

### 3.1.2 Guiding element choice



Please read the safety instructions provided at the beginning of this manual before handling the following devices.

The guiding elements are sensitive to corrosive products. Please do wipe or clean the element with any corrosive detergent. Use a dry cloth only to wipe the oil off the element.

Hydraulic oil is injected in the guiding element, which permits to hold the rotating bar in the center of the guiding element.

Depending on the bar diameters to guide, a guiding element changeover and/or the pusher changeover may be necessary. A standard pusher of  $\varnothing$  15 mm is delivered, but an optional pusher  $\varnothing$  8 mm is available upon request.

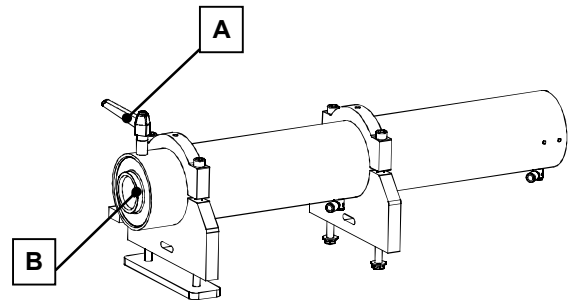
2 ranges of diameters are defined to select your pusher:

$\varnothing$ bar stock		$\varnothing$ pusher	No. pusher
de	à		
8	19	8	024-030-023
20	80	15	024-030-013

XX (inner  $\varnothing$  of the guiding element) = bar stock  $\varnothing$  + 1 mm

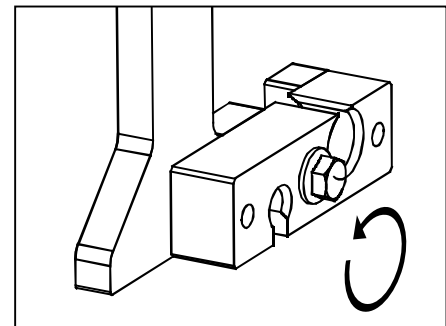
1. On the remote control, use the manual functions to move back the pusher to its reference, in lifted position.
2. Select the guiding element changeover function. This will move down the dropping fingers; the bar feeder will then wait for the user confirmation.
3. Open the main access cover.
4. Guiding element changeover:

- 4.1. Loose the quick screw (A)
- 4.2. Remove the guiding element (B)
- 4.3. Insert the new guiding element
- 4.4. Tighten the quick screw (A)



5. Pusher changeover (only if necessary):

- 5.1. Slide out the pusher from its locking support.
- 5.2. Remove the pusher by sliding it out to the back of the bar feeder.
- 5.3. For each pusher guide, loose the holding screw, turn 180° the synthetic part, tighten the holding screw.
- 5.4. Put the new pusher in all the pusher guides from the back of the bar feeder.
- 5.5. Lock the pusher back into the pusher locking support.



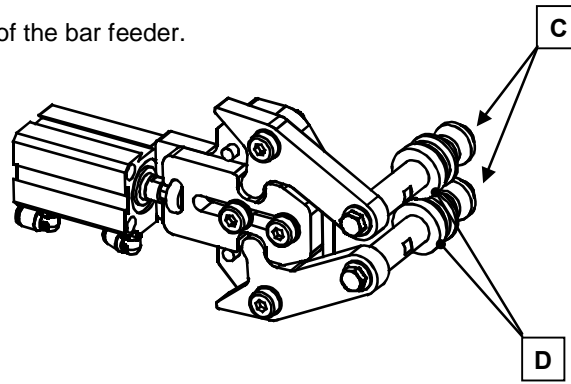
6. Pusher holding system setup (only if pusher change applied first):

6.1. Remove the rest cover located at the front of the bar feeder.

6.2. Loose the holding screws (C).

6.3. Turn the holding rolls (D) and tighten the screws (C).

6.4. Put back the rest cover.



7. On the remote control, confirm the end of the changeover function. The dropping fingers move back to their position.



## 3.2. Lathe mechanical setup

### 3.2.1. Clamping method

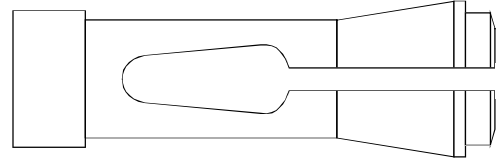
#### Collets

There are different kinds of collets that are more or less effective:

a) Simple cone collet

The bar is held over about  $350^\circ$ , over a length from 0.5 to 7 times the diameter.

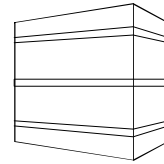
Efficiency : good to very good



b) Bi-conical collet

Clamping over 1 or 2 x  $350^\circ$ , over an approximate length of 1.2 times the diameter.

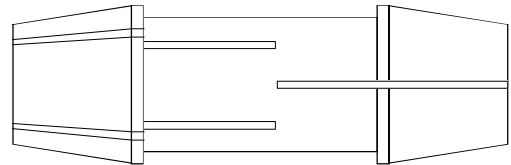
Efficiency : very good to excellent



c) Double cone collet

The double cone clamp has the great advantage of holding the bar at two points separated by about 1.5 the diameter, with a clamping  $2$  times  $350^\circ$  over about 0.5 times the diameter.

Efficiency : excellent



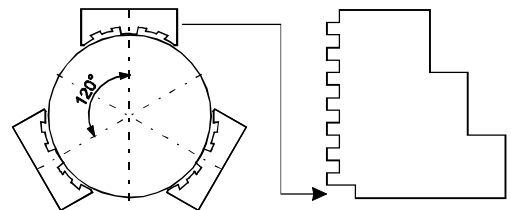
#### 3-jaws chuck

With this type of clamping, one should be very careful given that in many cases the bar is held only at three points, thereby greatly increasing the risk of vibration.

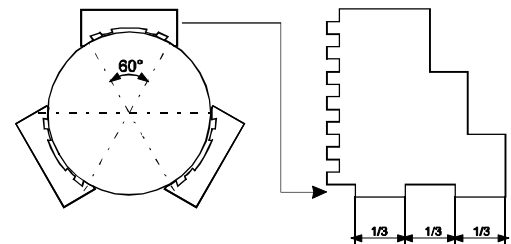
Frequent errors and possibilities for improving the effectiveness of the clamping grip.

a) Hard grips

Wrong : The radius of the grip is greater than the radius of the bar.  
The jaws press against only 3 points at  $120^\circ$ .

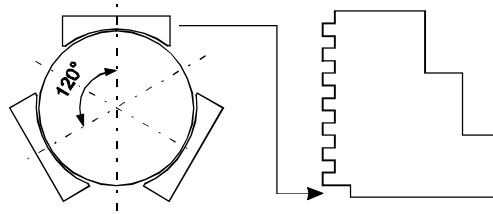


Correct : Modify the centers of the jaws to obtain 2 times 6 support clamping points at  $60^\circ$ .

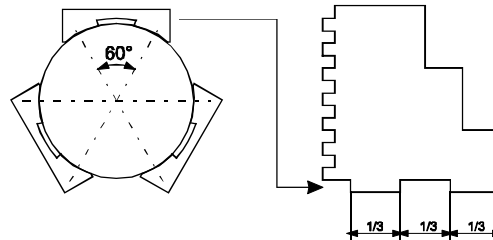


## b) Soft grips

Wrong : The radius of the jaws is greater than the radius of the bar. The jaws press against only three points at 120°.



Correct : Modify the centers of the jaws to obtain 2 times 6 support clamping points at 60°.



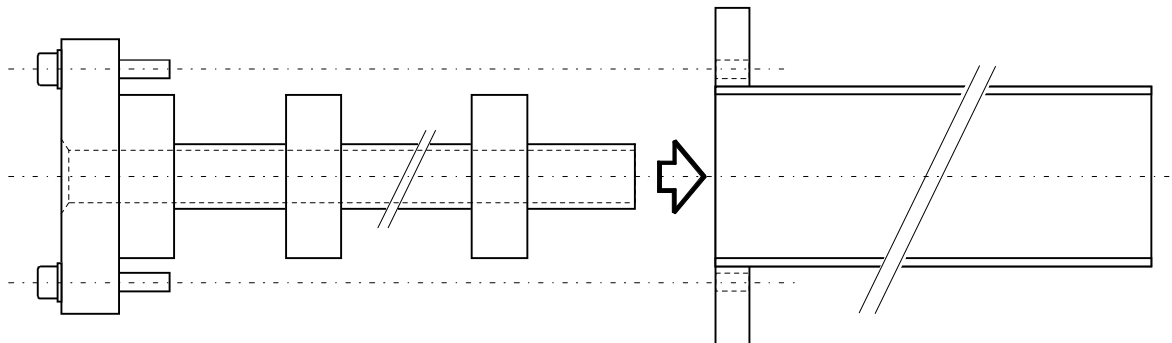
### 3.3. Lathe – bar feeder adaptation

#### 3.3.1. Spindle reduction tubes

The efficiency of the bar guiding while in rotation in the lathe is determined by the clearance between the spindle reduction tube and the rotating bar. The greater the clearance is, the more frequent the vibrations are.

Using reduction tubes helps to decrease this clearance. Guiding is thus improved, but, in addition, the insertion of the bar into the clamping device of the lathe is made much easier.

The inside diameter of the reduction tubes should be chosen in terms of the diameter of the bar ( $\varnothing$  of the bar + 1 mm), but should always be larger than that of the diameter of the feeding pusher.



For inserting and removing the spindle reductions, move the bar feeder using the retraction device (Chapter 4/ Point 3.1.1).

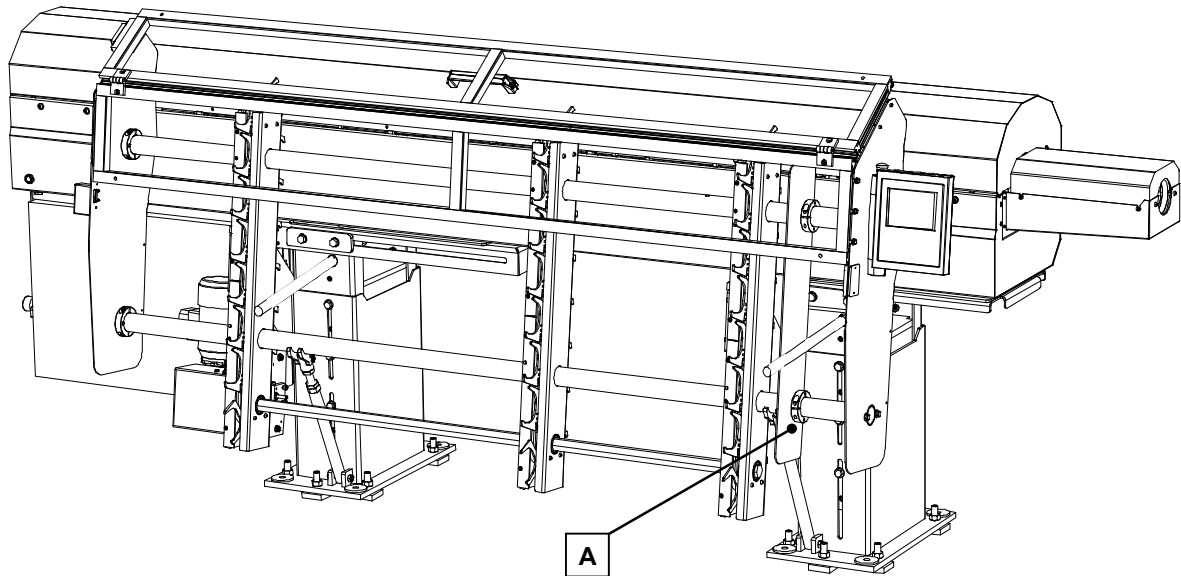
Spindle reduction tubes are available from LNS, upon request.

## 3.4. Chain loader

### 3.4.1. Loading a bar stock on the chain loader

Independent of the length of the bar feeder, the bar magazine includes 3 supports.

The bar stocks are lying on the hooks of these supports. When charged on the chain loader, the bar stocks should be against the front limiter (A).



When loading a new bar, a gear motor moves up the bars into the bar feeder on the dropping fingers, which slow down and position the bar stock at the guiding axis.


### 3.4.2. Use and setup of the dropping fingers

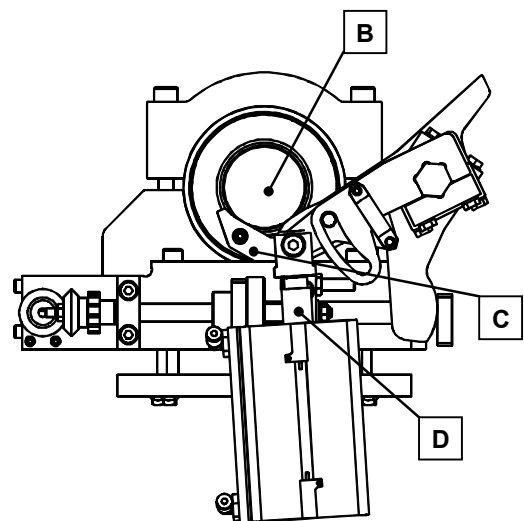
The loaded bar stock (B) is laying on the dropping fingers (C). The dropping fingers move down (D) and position accurately the bar stock at the guiding axis. If a drift is detected by the user, a positioning correction is necessary.

#### Conditions:

- bar stock loaded under conditions as point 3.4.1.

#### Round material to hex material change:

1. On the remote control, press the STOP key.
2. Press the key corresponding to the symbol .
3. In the menu "Misc. functions" > "Dropping fingers setup" > ENTER.
4. Adjust the vertical position of the bar stock to the guiding element by adding or removing pulses.
5. When the setup is satisfactory, escape the menu by pressing the STOP key.



### 3.4.3. Unloading a bar stock

When the bar is located in the guiding element, a specific function allows to lift it up for better handling.

Pull the bar stock out of the guiding element, then activate the bar unloading function. Once the dropping fingers in upper position, extract manually the bar stock, and confirm the proper bar removal.

The bar stocks on the chain loader can simply be removed by hand.

### 3.4.4. Positioning parameters setup



To validate a parameter or a value, hold the key corresponding to [ENTER] until the icon disappears.

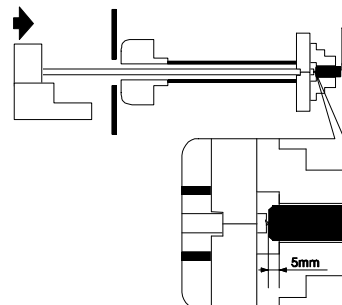
#### 3.4.4.1. End of bar position

The end of bar position determines the moment when the bar feed enters the loading cycle.

Usually, the end of bar position is adjusted as closely as possible behind the clamping system of the lathe (approximately 5 mm or a 1/4" behind the chuck jaws or collet pads).

This will provide minimum bar stock remnant.

Regardless of the length of the bars, or parts, the end of bar position is always the same.



#### End of bar setting







Before handling the bar feed, stop the lathe at the end of part cycle.

To edit these parameters, the bar feeder must be in **STOP** mode.

To validate a new parameter or a new value, keep [ENTER] pressed until the icon disappears.

- 1  Press the [STOP] key.  
[STOP]

- 2  Enter the main menu.

- 3  Enter the menu "positions/torques".  
  
  
[ENTER]

4

Screen "End of bar position":

Press the key corresponding to the icon **[SET]**.

Depending on which sequence the bar feed is in when the parameter is selected, the available functions and icons can change :

Conditions	Available functions	
	By offset correction	By teaching
- <i>Guiding channel closed</i>	Icon <b>[+/-]</b>	Icon <b>[TEACH IN]</b>
- <i>No bar stock in the loading channel</i>		
- <i>All other cases</i>	Icon <b>[+/-]</b>	---

**Setting by offset correction:**

**jump to point 5**

**Setting by teach in:**

**jump to point 6**

5

**[+/-]**By offset correction:

- Press the key corresponding to the icon **[+/-]**.
- The current end of bar position (Z) is displayed.
- Enter with the direction keys the correction to insert, and press the **[+]** icon to add the value, or the icon **[-]** to subtract it. The new value is stored and displayed.
- To exit the end of bar set mode, press the key attributed to the icon **[ESC]**.

**Jump to point 7.**

6

**[TEACH IN]** By teaching:

- Press the key attributed to the icon **[TEACH IN]**. The display shows the current end of bar position.
- Press the key **[FWD]** and advance the pusher to the desired position (see previous page).
- To validate the new end of bar position, keep **[ENTER]** pressed until the icon disappears.



7



To exit the set mode, press the keys **[ESC]** or **[STOP]**.

or



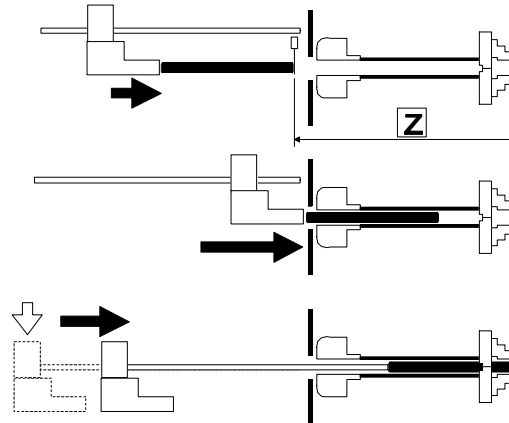
**[STOP]**

### 3.4.4.2. Top-cut position

During the loading cycle, the bar is automatically loaded and positioned into the spindle, outside the clamping device of the lathe (chuck or actuator).

This positioning corresponds to a value (Z) programmed by the operator, which is equal to the distance between the measuring cell and the position of the material in the lathe clamping device.



With this system, the setting is the same for any bar length.




#### Top cut position setting







Before handling the bar feeder, stop the lathe at the end of part cycle.  
To modify these parameters, the bar feeder must be in **STOP** mode.  
To validate a parameter or a value, hold the key corresponding to **[ENTER]** until the icon disappears.

- 1  Press the key [STOP].  




---

- 2  Enter the main menu.

---

- 3   
  
 Enter the menu "positions/torques".  


---

- 4  Go to the screen "top cut position".  


5



Screen "Top cut position":

Press the key corresponding to the icon **[SET]**.

Depending on which sequence the bar feed is in when the parameter is selected, the available functions and icons can change :

Conditions	Available functions	
	By offset correction	Teach in
- Guiding channel open - Bar stock in the loading rack - Pusher in home position	Icon <b>[+/-]</b>	Icon <b>[TEACH IN]</b>
All other cases	Icon <b>[+/-]</b>	---

**By offset correction:**

**jump to point 6**

**By teach in:**

**jump to point 7**

6



**[+/-]** By offset correction:

- Press the key attributed to the icon **[+/-]**. The current top-cut position (Z) is displayed.
- Enter with the direction keys the correction to insert, and press the **[+]** icon to add the value, or the icon **[-]** to subtract it. The new value is stored.
- To exit the top-cut position set mode, press the key attributed to the icon **[ESC]**.

**Jump to point 8.**

7



**[TEACH IN]** By teaching:

- Press the key attributed to the icon **[TEACH IN]**.
- Press the key attributed to the icon **[START]**.
- A bar is loaded and the guiding channel is closed. The feeding pusher inserts the bar into the lathe spindle. The feeding pusher is now facing the spindle.
- Press the key **[FWD]** and advance the bar stock to the desired position (see previous page).
- To validate the new top cut position, keep **[ENTER]** pressed until the icon disappears.

8




or



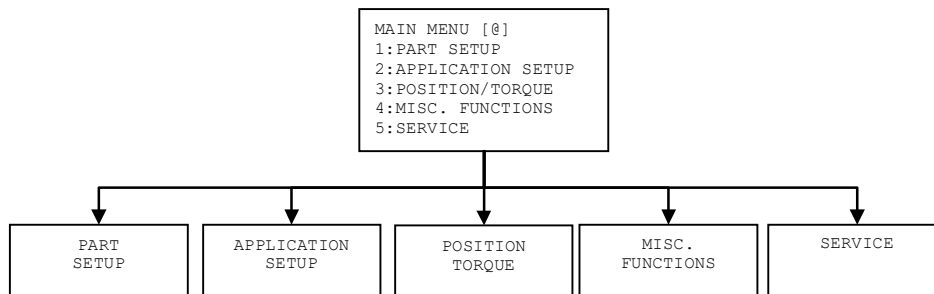
To exit the set mode, press the keys **[ESC]** or **[STOP]**.

## 4. ACCESS TO THE FUNCTIONS

By pressing the **[SET]** key (icon ), it is possible to access the setup functions, no matter what cycle the bar feed is in (automatic sequence, manual sequence, etc.).



To modify these parameters, the bar feed must be in STOP mode. To validate some values or parameters, hold the **[ENTER]** key until the icon disappears.



### Part setup

Allows to define the parameters and values of the part, like:

- Bar stock shape (round, hex, square, other)
- Bar stock diameter
- Overall part length to feed
- Number of clamping device openings
- Reverse distance of the pusher after feeding
- Overall part length for the auxiliary part (remnant machining)

### Application setup

Allows to set quickly the working mode by selecting the desired application. Following working modes are always available:

1. Feed with turret
2. Feed without turret
3. Misc. functions (Dry Run, etc.)

Depending on the unlocked features and on the lathe, following modes may be available:

4. Sub-spindle
5. etc.

### Position/torque

Quick access to the following position and torque values:

- End of bar
- Top cut
- Auxiliary end of bar
- Torque for the bar stock loading
- Torque for the part feeding

### Misc. functions

Allows the access to specific settings like:

- Language
- Measure unit
- Reference

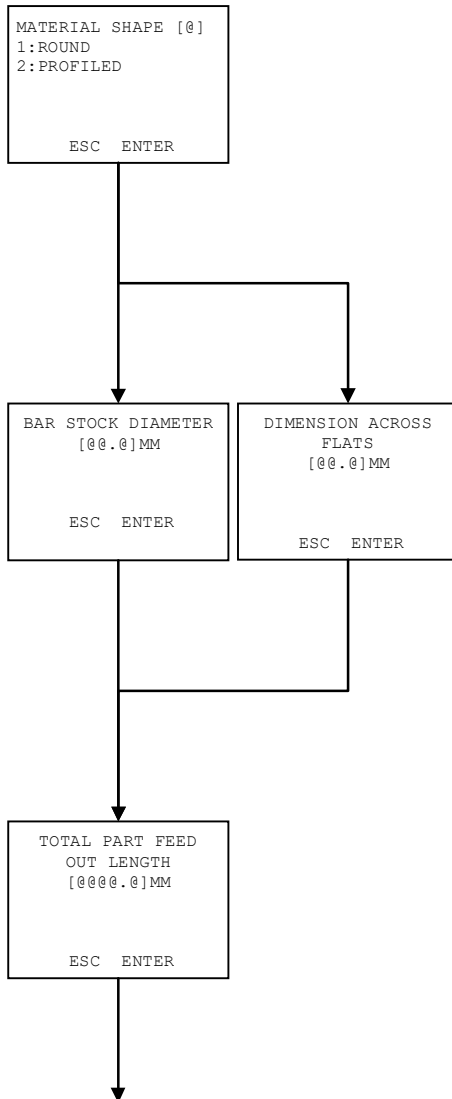
### Service

Reserved for maintenance to LNS technicians and for unlocking features/displays.



## 4.1. Part setup

All handling, adjustments, and settings that need to be done on the bar feeder for executing a part are included in the start-up. This section presents a brief explanation of the start-up parameters of the bar feeder.



### Material shape

If parameter 2 is selected:

- When the material is profiled, the bar feeder will try several times (for 2 minutes), to position the bar inside the clamping device of the lathe. The accuracy of the positioning is also assured by a positioning procedure designed specifically for profiled bars.
- The setting of the loading table and of the fingers changes. This setting is automatically done by motor M3.

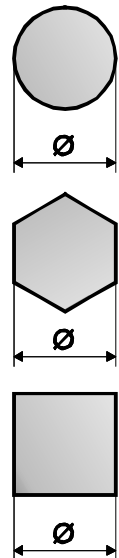
As soon as parameter 1 is selected, the M3 motor automatically repositions the table and the fingers in standard position.

### Bar stock diameter

It is important, at each change in start-up, that the diameter of the new bars that the bar feeder will load is updated in the parameters.

The PLC, therefore, takes this into account and adapts the torque of the pushers. A greater precision of positioning can therefore be guaranteed. Moreover, small diameter bars will not bend under the pressure of the pusher. The value of the diameter entered will automatically determine the **closed** position of the front rest jaw.

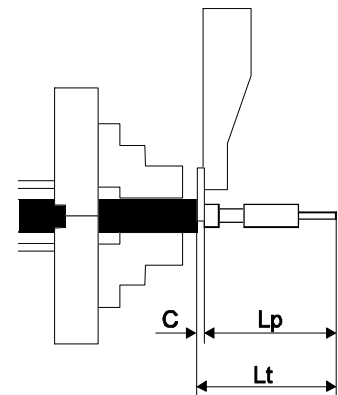
**Round:** outer diameter  
**Hex/square:** dimension across flats

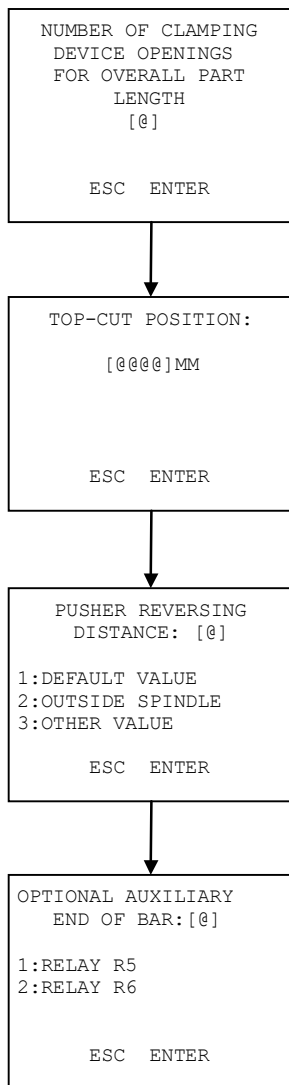


### Total part feed out length

The servomotor is precise enough to feed the part during the opening of the clamping device of fixed headstock lathes.

The feed-out length (**Lt**) includes the part length (**Lap**), the cut-off tool width (**C**) and the face-off length.

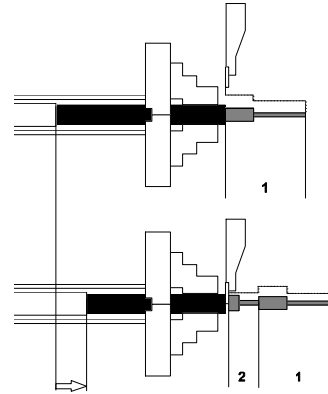




### Number of clamping device openings for overall part length

When the machining of a part requires several openings of the clamping device (for ex.: a long part, or transfer of the part to the sub-spindle), some interface conflicts may occur during the feeding process.

It is important for the bar feeder to be informed of the number of times the clamping device must open for the machining of a part.



The bar feeder only carries out the first positioning for a single part. The following positioning (if any) must be done by the turret.

### Top-cut position

During the loading cycle, the bar is automatically loaded and positioned into the spindle, outside the clamping device of the lathe (chuck or actuator).

This positioning corresponds to a value (Z) programmed by the operator, which is equal to the distance between the measuring cell and the position of the material in the lathe clamping device. With this system, the setting is the same for any bar length. Further information in the chapter 4. Operation, point 3.4.4.2.

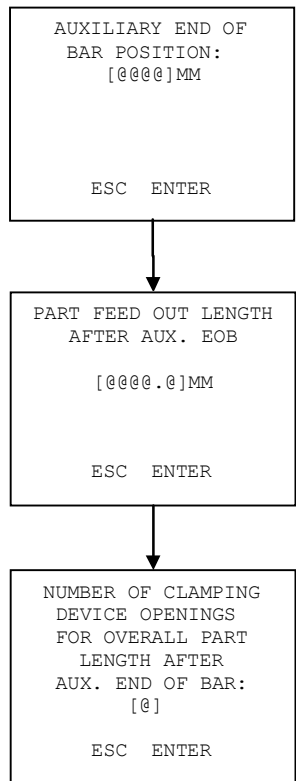
### Pusher reverse distance after feeding

In production cycle, each time the clamping device of the lathe closes, the feeding pusher moves backwards so as not to come into contact with the rotating bar. The value of the reverse distance is set at 4 mm at the factory.

1. Default value (4 mm)
2. Outside of the spindle
3. Enter the desired value

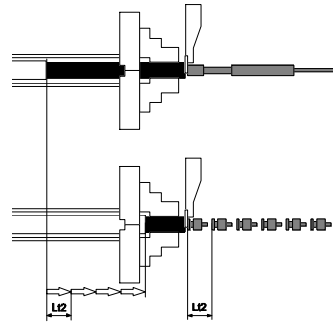
### Optional auxiliary end of bar (option)

When machining remnants (A) that are rather long, a second mode of production for machining the rest of the stock can be selected (depending on the capabilities of the lathe).



### Part feed out length after aux. EOB (option)

When machining remnants (A) of significant length, a second mode of production may be selected to machine the remainder of the stock (depending on the capabilities of the lathe). The lathe starts a second machining program and manufactures shorter parts. Like the previous parameter, this parameter indicates the total length of piece bar feed but in this instance, for the second machining (Lt2). The length of the bar feed includes the length of the piece to be machined and the thickness of the cut off tool.



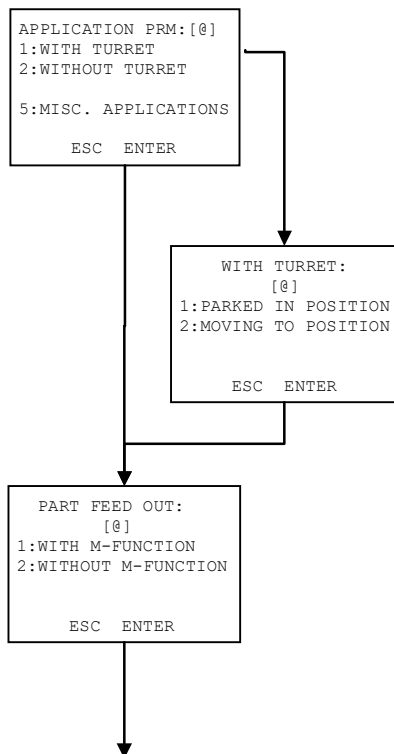
### Number of clamping device openings after aux. EOB (option)

Like the previous parameter, this parameter indicates the number of times the clamping device will open during the machining of the piece, but in this case, for the second machining.

### Auxiliary end of bar position (option)

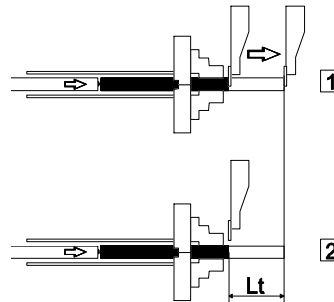
Depending on the lathe and its options, the auxiliary end of bar may be used in several ways, for example for the opening of an external rest. The procedure is the same as this for the end of bar setting.

## 4.2. Application setup



### Part feed out with turret

This parameter determines whether the lathe or the bar feed will control the positioning of the part.



### Additional parameter (option):

- The turret is parked in position:  
the turret travels to the point the bar stock will be pushed to and waits that the bar feed has pushed the material to this point.
- The turret is moving to position:  
The turret comes to the bar stock end; the bar feed starts pushing against the turret. Then, the turret moves to the desired feeding length, the bar feed still maintaining the bar stock pressure against the turret.

### Part feed out without turret

The bar feed drives the feeding cycle. When the clamping device opens, the bar feed pushes the bar stock according to the parameter "overall part length" value. The bar feed is not able to drive the feeding cycle if the machining process requires several clamping device openings.

### Part feed out with M-function (option)

This parameter is used to deactivate the M function receipt of the turret if this function is not used in the lathe interface. In this case, a timer can be used to give the receipt.

### Dry Run

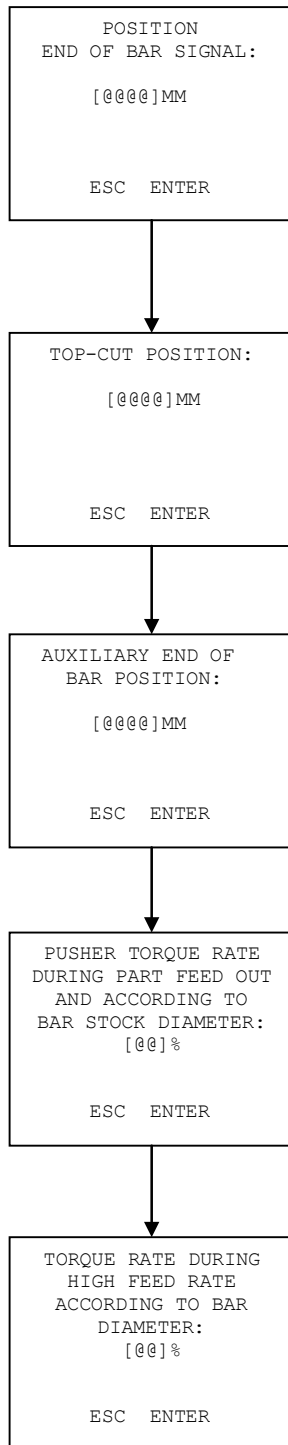
This function allows the lathe to run without the bar feeder, ex.: hand loading pieces, etc.

### Pusher is used as mechanical stop in the spindle of the lathe (option)

When pieces are loaded manually (without the bar feeder), the pusher can be used as a mechanical stop in the spindle of the lathe and is generally located behind the clamping device to ease the positioning of the pieces in the clamping device.

To enable this machining mode, the interface signals are inhibited. When the clamping device is closed, the pusher moves backward to avoid contact with the rotating bar.

### 4.3. Position/torque



#### End of bar position

The end of bar position determines the moment when the bar feed enters the loading cycle.

Usually, the end of bar position is adjusted as closely as possible behind the clamping system of the lathe (approximately 5 mm or a 1/4" behind the chuck jaws or collet pads). This will provide minimum bar stock remnant.

Regardless of the length of the bars, or parts, the end of bar position is always the same. In very special cases, a different end of bar setting needs to be selected.

Refer to the Start-up manual for the settings.

#### Top-cut position

During the loading cycle, the bar is automatically loaded and positioned into the spindle, outside the clamping device of the lathe (chuck or actuator).

This positioning corresponds to a value (Z) programmed by the operator, which is equal to the distance between the measuring cell and the position of the material in the lathe clamping device.

With this system, the setting is the same for any bar length. Further information in the startup manual.

#### Auxiliary end of bar position (option)

Depending on the lathe and its options, the auxiliary end of bar may be used in several ways, for example for the opening of an external rest. The procedure is the same as this for the end of bar setting.

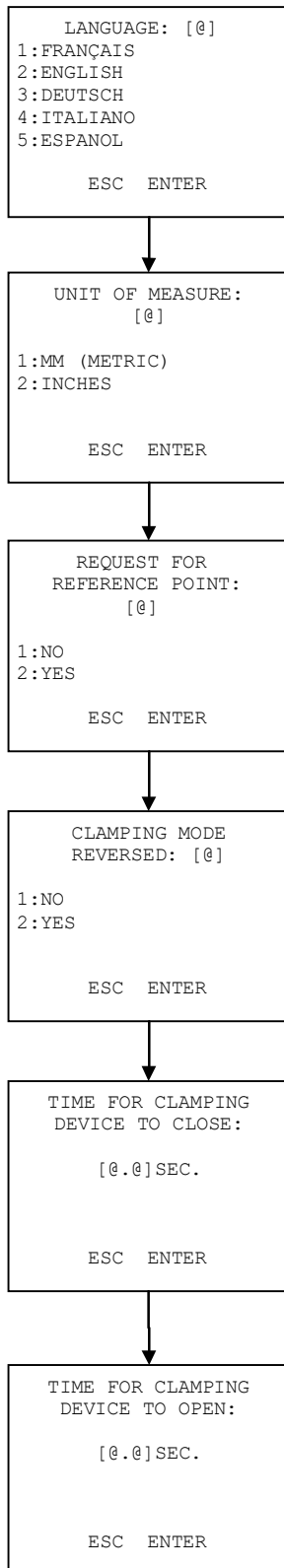
#### Pusher torque rate during part feed out and according to bar stock diameter (%)

Depending on the diameter of the bar, the bar feeder will automatically select an appropriate pushing torque and speed. The operator may modify this selection if necessary. When the material to be loaded has a high specific weight, the torque must be significant. The contrary applies if the specific weight of the bars is low.

#### Torque rate during high feed rate according to bar diameter (%)

Depending on the diameter of the bar, the bar feeder will automatically select an appropriate pushing torque and speed. The operator may modify this selection if necessary. When the material to be loaded has a high specific weight, the torque must be significant. The contrary applies if the specific weight of the bars is low.

## 4.4. Miscellaneous functions



### Language

This parameter allows to adapt the language in which the messages will appear, depending on the country of destination of the bar feeder (*for practical reason, it is not necessary to stop the bar feeder to select a language*).

### Unit of measure (millimeters/inches)

This parameter defines whether the measures will be indicated in millimeters or in inches.

### Request for reference point

This operation allows the bar feeder to find the original position of the servo motor and the parameters when and if these have been lost.

### Clamping mode reversed (option)

The interface signal is reversed depending on whether the clamping device functions by pushing or by pulling. It is therefore essential to know the operation of the clamping device, without this, the feeding process cannot be done correctly.

### Time for clamping device to close

This is the time it takes for the clamping device to be physically closed. The majority of CNC lathes are equipped with confirmation switches to provide this signal. The time is set at a default value of zero seconds.

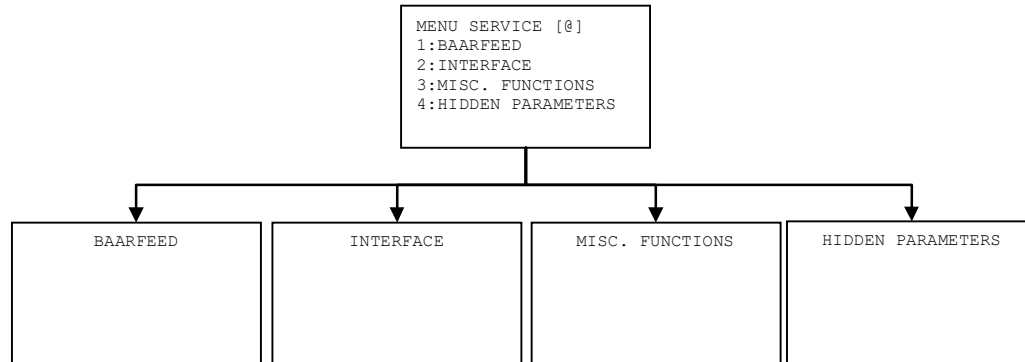
### Time for clamping device to open

In the case of a clamping device with jaws, sometime may be provided to prevent any movement before the clamping device is completely open.

## 4.5. Service

### Password

The service parameters allow to configure the bar feeder in its environment and to adapt the interface connected to the lathe. These parameters are protected with a password, because only LNS (or certified) technician is authorized to modify them.




---

#### 1. Bar feeder

Allows to define the bar feeder settings, like:

- working speeds;
- default torques;
- mechanical configuration of the bar feeder.

---

#### 2. Interface

To configure the interfacing signals between the lathe and the bar feeder, like:

- clamping device signal of the lathe;
- relays states in the several phases of the production cycle;
- configuration of additional inputs.

---

#### 3. Misc. functions

Access to miscellaneous functions, like:

- Working mode (exhibition, simulation, etc.)
- Workshop configuration

---

#### 4. Hidden parameters

Allows hiding or showing some menus if they are not useful to the operator.

- parameters
  - application
-

## 5. AUTOMATIC CYCLE

The bar feeder autonomy is depending on the bar stocks placed by the operator on the chain loader. This task can be performed at any time in the production cycle, without needing to open the main access cover.

Every time the automatic cycle is to be started, it is recommended to check following points:

- On the chain loader, the bar stocks must be against the front limiter.
- The guiding element must be adapted to the bar stock diameter.
- The pusher must be adapted to the bar stock diameter, to the guiding element diameter and to the spindle inner diameter (including spindle liner).
- The pushing force must be adapted to the bar stock material.
- On the lathe, the clamping device must be adapted to the bar stock diameter.

### 5.1. New loading bar stock

1. The bar stock on the chain loader is loaded on the dropping fingers. The pusher is in back position, lifted up and the pusher holding system is open.
2. The loading flag moves forward and pushes the bar stock in measuring position. The bar length is measured.
3. The loading flag goes on to maximal forward position and inserts the bar stock in the spindle.
4. The loading flag moves back to maximal back position.
5. The pusher moves down in working position.
6. The pusher moves forward to the bar stock and finishes the positioning in clamping position (top-cut).
7. The lathe's clamping device closes.

### 5.2. Part feed out

8. The pusher moves back by the selected value.
9. The automatic cycle starts, the parts are machined.

To each clamping device opening, the pusher moves forward, positions the bar stock for the next part, then moves back by the selected value.

### 5.3. Remnant extraction

10. The cycle goes on until end of bar signal is given. At this point, the lathe enters a sub-program and the pusher moves to reference position.
11. The pusher moves up.



---

# CHAPTER 5

# MAINTENANCE

## 1. PERIODIC MAINTENANCE

### 1.1. Caution on cleaning

A regular cleaning of the bar feeder will optimize its quality of working and increase its lifetime.

Wipe down the outside of the bar feeder with a cloth and any regular detergent. For cleaning the inside of the bar feeder, use a cloth or a smooth brush, however, do not use these on any of the rollers or any other parts made of synthetic materials. The use of compressed air for cleaning is not advisable, because chips and other particles can become lodged in sensitive areas and can impede the proper operation of the bar feeder.



Do not use any corrosive detergent, like acetone. Detergents should never come in contact to the electrical elements.

### 1.2. Periodic control plan

Action	Frequency		
	weekly	monthly	yearly
Pusher supports	I		
Pusher belt drive		I	I
Pusher guides		I	I
Chain loader		I	I
Guiding elements		I	I
Pusher holding rolls		I	I
Anchoring to ground			I
Alignment			I
Switches cables		I	I
Servo amplifier battery		I	R
PLC battery		I	R
Safety systems control		I	I
Hydraulic oil quality			R
Hydraulic pump motor function		I	I
Air valves block control		I	I
Air conditioning unit purge		I	I

I = Inspect the status, replace if necessary

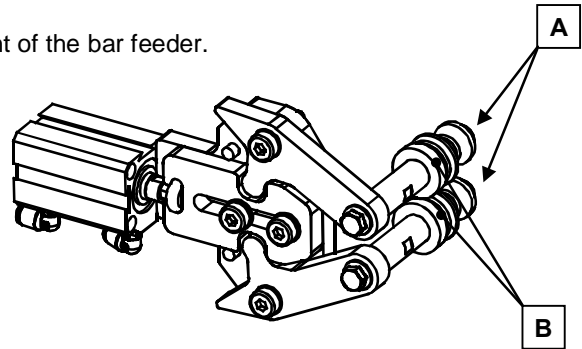
R = Replace

## 2. MECHANICAL OPERATIONS

### 2.1. Pusher holding rolls replacement

When worn out, the pusher holding rolls must be replaced:

1. Remove the rest cover located at the front of the bar feeder.
2. Loose the holding screws (A).
3. Remove the rolls (B).
4. Install the new ones.
5. Tighten the screws (A).
6. Put back the rest cover.



## 3. ELECTRICAL EQUIPMENT



Please read the safety instructions provided at the beginning of this manual before handling the following devices.

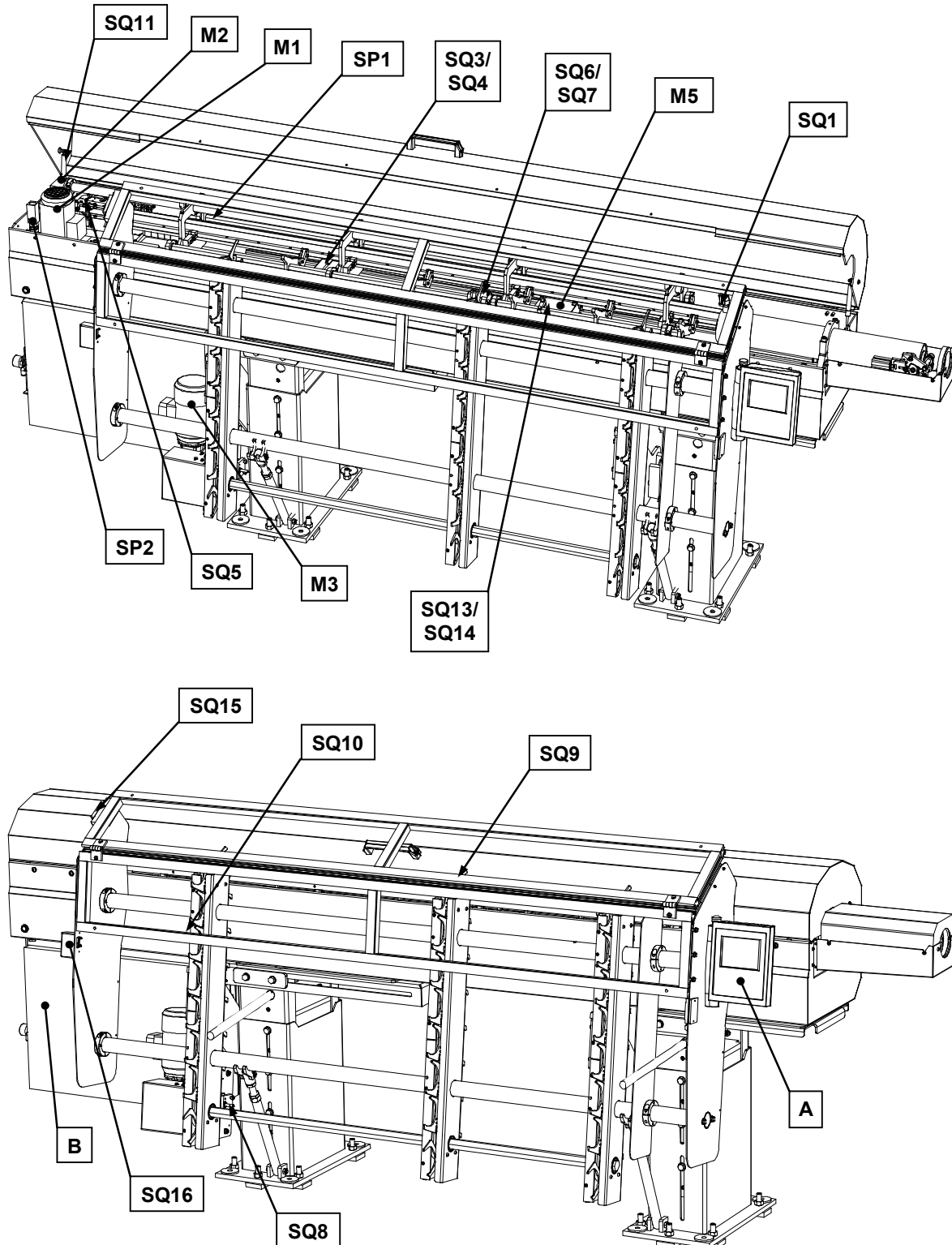


Particular attention should be given to the handling of electrical elements because of risks of electrocution. In case of possible electrical malfunctions, it is advisable to contact LNS or its local representative.

This chapter contains all of the elements regarding the electrical circuit of the bar feeder. The electrical parts, and groups, which may require a setting, at some time or other, are described herein in detail.

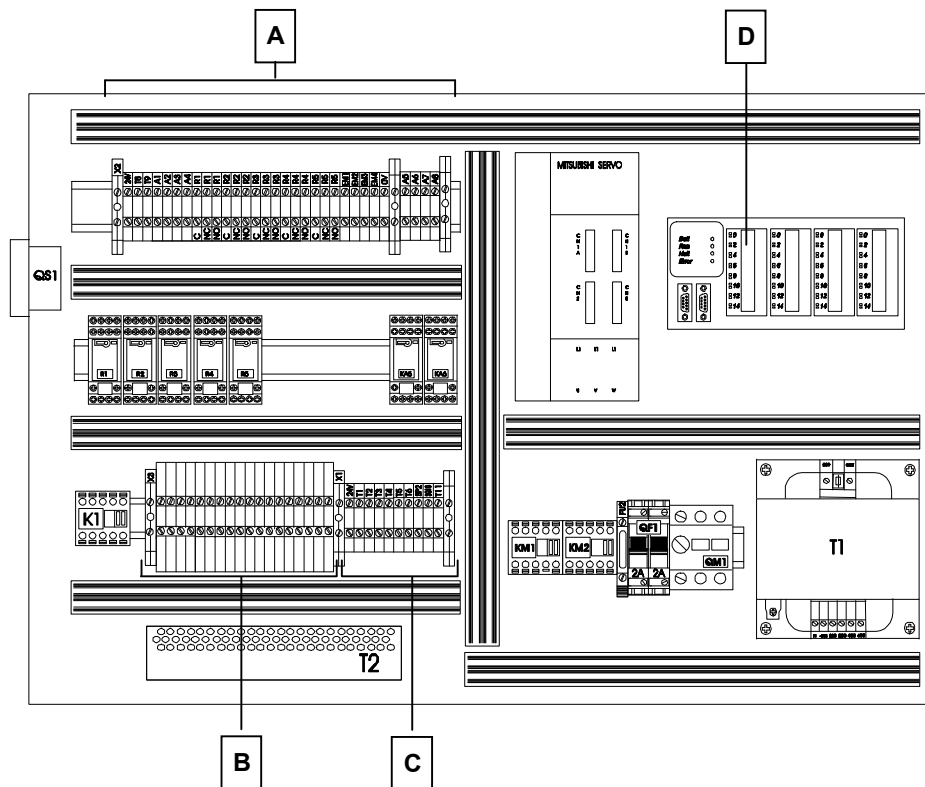
Whenever possible, the article numbers of the elements are shown in tables below each drawing. When a group of elements is indicated, look for the element and then write down the ordering number of the desired element.

### 3.1. Layout of electrical elements



<b>Designation</b>	<b>Article No</b>	<b>Description</b>
A	4.875/4.6	Remote control
B		Electrical cabinet
M1	2.210.150	Hydraulic pump motor
M2	4.706	Servo motor (cable directly to the electrical cabinet)
M3	4.886	Chain loader motor 220/400 VAC
M5	4.307	Diameter setup motor for dropping fingers
QS1	4.242	Main disconnect switch
SP1	3.638	Air pressure switch
SP2	4.050	Hydraulic pressure switch
SQ1	4.772	Measuring cell (optical cell)
SQ3	4.968	Pusher support in open position switch
SQ4	4.968	Pusher support in closed position switch
SQ5	4.391	Pusher in home position switch
SQ6	4.968	Bar stock laying fingers down position control
SQ7	4.968	Bar stock laying fingers up position control
SQ8	4.391	Chain loader indexing switch
SQ9	4.772	Bar stock presence proximity switch
SQ10	4.484	Retract system safety switch
SQ11	4.484	Main access cover closed switch
SQ13	4.391	Dropping fingers reference
SQ14	4.391	Referencing for dropping fingers proximity switch
SQ15	4.763	Chain loader protection safety switch
SQ16	4.773	Safety switch : light beam on chain loader

### 3.2. Electrical cabinet



Designation	Article No	Description
A	-	Interface terminal blocks X2
B	-	Valves terminal blocks X3 (YV2 . YV11)
C	-	Safety terminal blocks X1 (T1 . T11)
D	4.907	Programmable controller PCD3 (PLC)
K1	4.507	Safety chain control
AJ1	44.0105	Servo amplifier 400 W
FU1	4.419	Automatic front rest fuse 2 A
KA5	4.606	Relay dropping fingers to upper position
KA6	4.606	Relay dropping fingers to lower position
KM1	4.507	Hydraulic pump motor M1 relay
KM2	4.507	Chain loader motor M3 relay
QF1	4.815	Circuit breaker 4 A
QM1	4.503	Main circuit breaker 2.5 to 4 A
QS1	4.242	Main switch
R1	4.606	Alarm relay
R2	4.606	Bar feeder loading cycle relay
R3	4.606	End of bar relay
R4	4.606	Headstock release relay
R5	4.606	Auxiliary end of bar relay
T1	4.769	Transformer 1-ph
T2	4.779	Power supply 24 VDC, 150 W

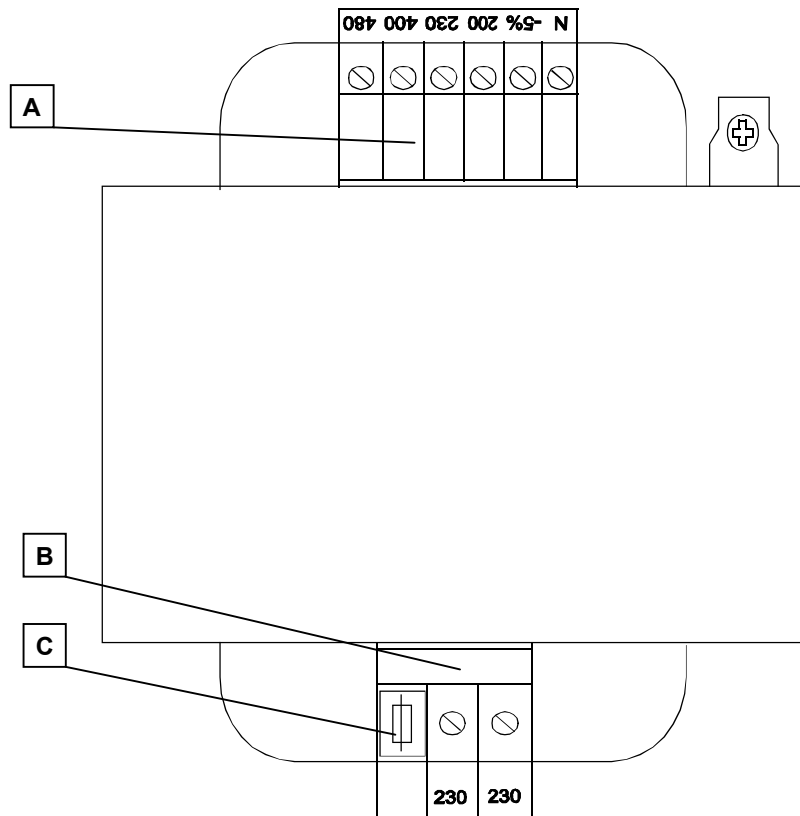
### 3.3. Replacement of the fuse of the transformer T1

To replace the fuse:

1. Unscrew the cap a quarter of a turn to the left;
2. Remove and replace the fuse with an identical one, and put the cap back.

On the primary side, the transformer accepts a voltage of 200-480 V, 50 Hz/60 Hz. Measure the power provided by the lathe, and, if necessary, adapt the cable on the power terminal block (A).

Although fuses seldom need replacing, is it advisable to keep some spare ones on hand.



Designation	Description
A	Primary terminal block, 200-480V, 50 Hz/60 Hz $\pm$ 15%
B	Secondary terminal block, 230 V
C	Fuse 3.15 A (230 VAC)

The T2 power supply has an output of 24 VDC and powers the rest of the bar feeder's functions. The transformer T2 output is protected by a fuse installed in a support in the electrical cabinet.

### 3.4. Servo amplifier

The servo amplifier enables the programmable controller to control the movements of the motor.

The input values, as well as the position of the pusher carrier, are continuously registered. The values are saved by means of a battery, and, therefore, the axes do not need to be placed at zero when the bar feeder is powered on.

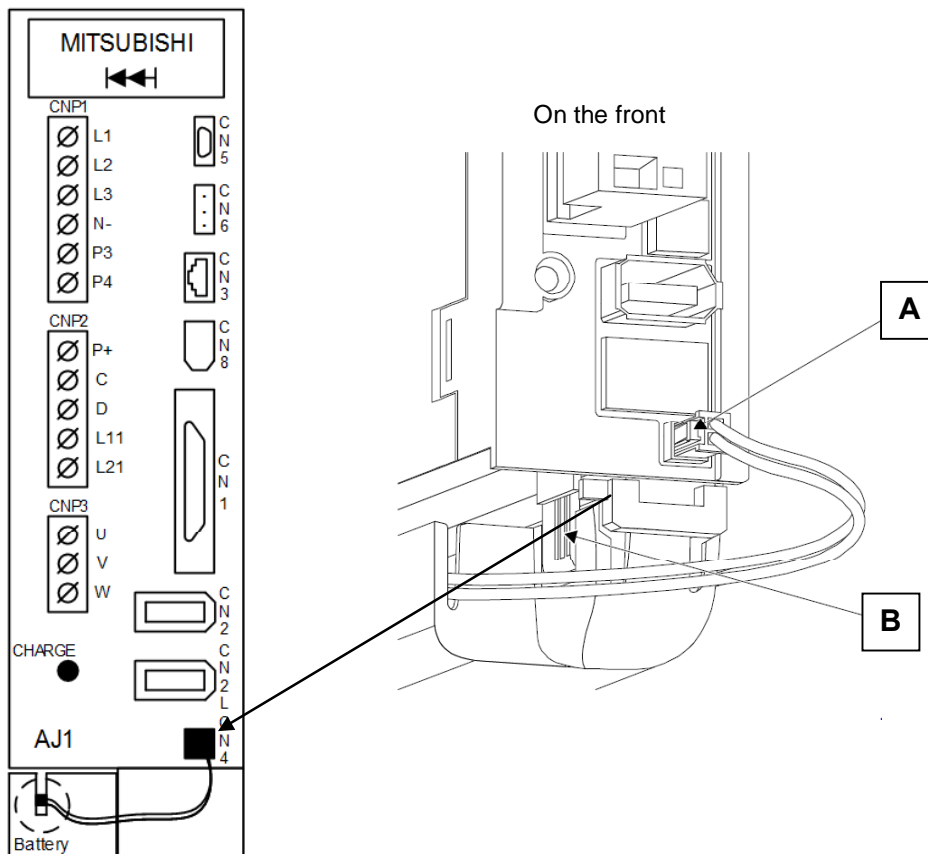
Although the batteries last for a relatively long time (2-3 years), it is advisable to keep spares on hand. When a battery becomes low, the amplifier signals this through a control light. The battery **is not rechargeable**, and must be replaced right away. The replacement must be done while the bar feeder is still powered up.

#### Procedure:

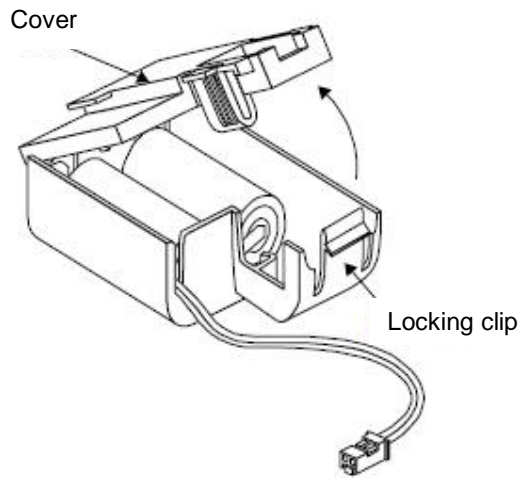
1. Disconnect the connector CN4 (A).
2. Open the battery compartment (B) according to the procedure below.  
The wires on the extremities of the battery connecting it to the connector are part of the battery.
3. Fit the new battery inside the support and close it.  
Connect the connector.



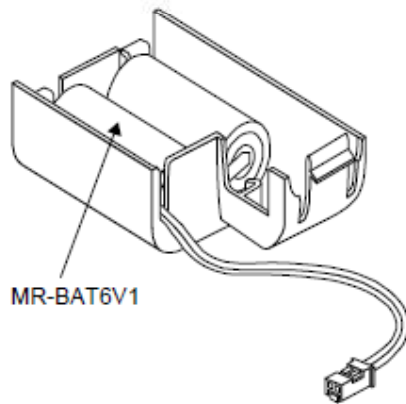
*Used batteries must be disposed of in an ecologically safe manner.*



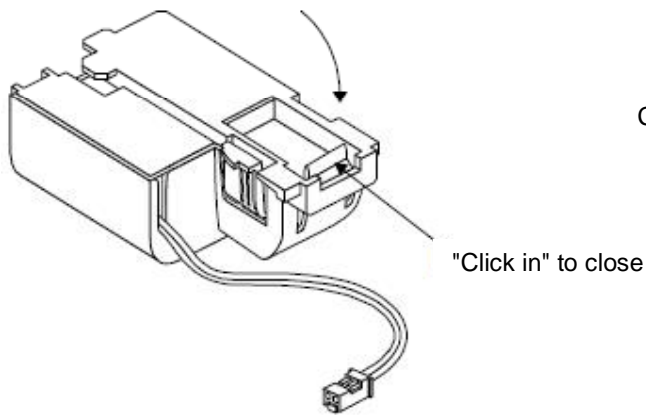




Open the battery compartment.



Remove the battery from its housing and replace.

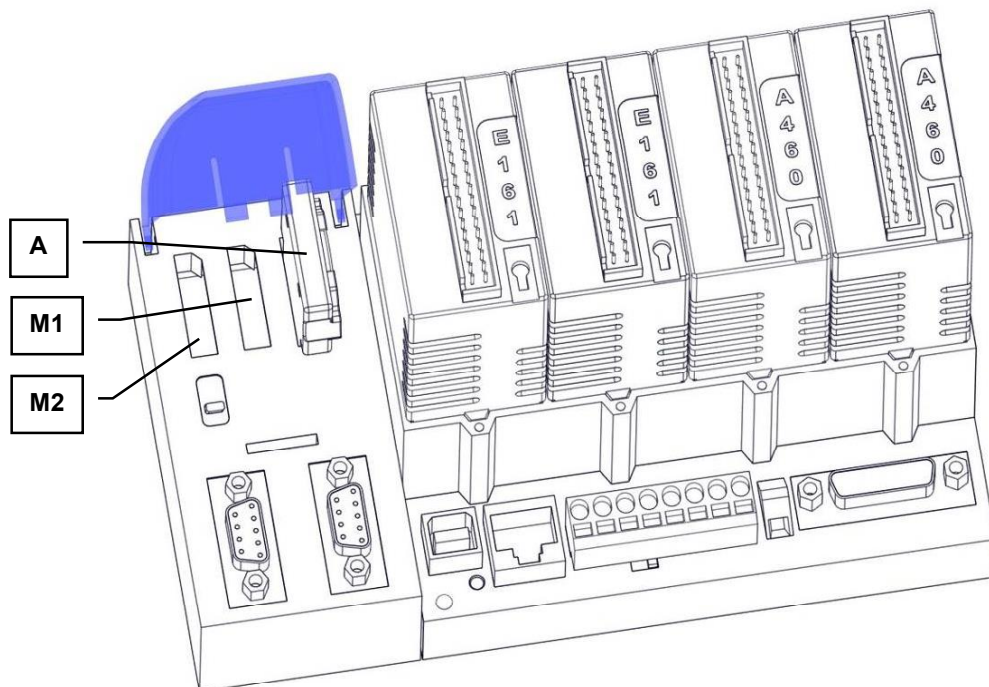


Close the battery compartment.

### 3.5. Programmable controller (PLC)

The programmable controller (PLC) continuously scrutinizes all data from the remote control, sensors, switches, cells, interface, etc.

The program loaded into the PLC manages this information. The PLC then distributes the interface signals, controls the SERVO drives as well as the pneumatic valves, and displays the appropriate messages on the remote control station.



Designation	Description
A	Battery module
M1	Slot for software updates
M2	Slot for memory expansion (in use as standard)

#### Battery module:

Batt: The PLC does not need a backup battery on the information module.

Run: The PLC is in RUN mode. This is the standard mode.

Halt: The PLC is in HALT mode. Contact your LNS dealer.

Error: The PLC is in a failure mode. Contact your LNS dealer.

#### M1 slot:

Usually this slot is left unused, and is used for software updates through flash (red) cards. Do not insert any flash card unless instructed by LNS.

#### M2 slot:

This slot is used by a flash (blue) card as memory expansion. Do not remove the flash card unless instructed by LNS.

### 3.6. PLC inputs/outputs

Inputs			Outputs		
Input	Des.	Input	Des.	Input	Des.
I0	SQ1	Measuring cell	O32	YV2	Valve dropping fingers
I1	SQ3	Pusher lift system high	O33	YV3	Valve air blast
I2	SQ4	Pusher lift system low	O34	YV4	Valve pusher guide
I3	SQ5	Pusher in referencing position	O35	YV5A	Valve pusher lift system high
I4	SQ6	Dropping fingers down	O36	YV5B	Valve pusher lift system low
I5	SQ7	Dropping fingers up	O48	KM1	Relay hydraulic pump
I6	SQ11	Main access cover safety	O49	KM2	Relay chain loader motor M3
I8	SQ13	Reference dropping fingers	O50	KA5	Relay dropping fingers high
I15	SP1	Air pressure switch	O51	KA6	Relay dropping fingers low
I16	K1	Safety line relay	O54	SON	Motor Servo ON
I17	SP2	Oil pressure switch			
I18	SQ10	Retraction safety switch			
I19	SQ8	Indexing chain loader			
I20	SQ9	Bar stocks on chain loader			
I21	SQ15	Safety grid switch			
I22	SQ16	Chain loader optical safety switch			
INT0	SQ14	Dropping fingers pulse input			
Interface			Interface		
I24	A1	Clamping device signal	O56	R1	Alarm relay
I25	A2	Lathe in auto cycle	O57	R2	Relay bar feeder in loading cycle
I26	A3	Feed order	O58	R3	Relay End of bar
I27	A4	Push order	O59	R4	Relay automatic mode
I28	A..	Programmable interface input	O60	R5	Relay auxiliary end of bar
I29	A..	Programmable interface input	O61	R6	Option
I30	A..	Programmable interface input	O62	R7	Option
I31	A..	Programmable interface input	O63	R8	Option

### 3.7. Circuit breakers

#### Main disconnect switch QS1

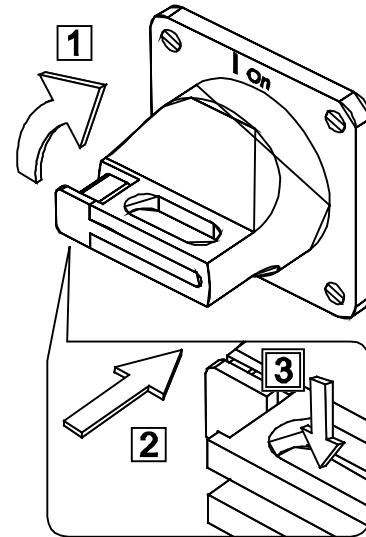
When the main disconnect switch is at 0/OFF, it interrupts the input of the three phases in the control cabinet of the bar feeder.

To power up the bar feeder, turn (1) the switch handle to the right, to the I/ON position.

To power down, turn the switch to the left, to the 0/OFF position.

The master switch can be locked with a padlock. This means it is impossible to switch the bar feeder on.

Push (2) the locking mechanism and insert (3) the padlock into the opening. Lock the padlock.



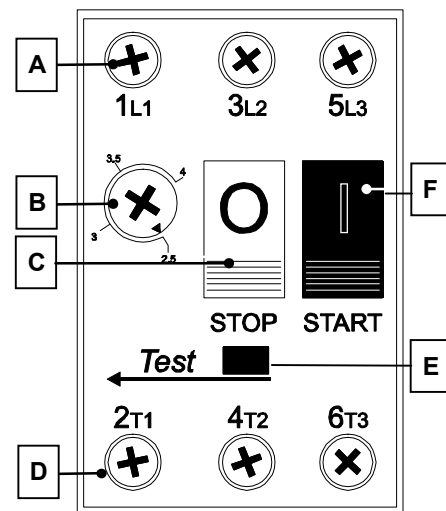
#### Main circuit breaker QM1

Circuit breaker QM1 interrupts the phases which power the hydraulic motor.

If the motor requires excessive power, the circuit breaker activates and push-button (C) STOP is released. For safety reasons, the power supply to the motor is immediately interrupted. After having located and repaired the problem causing this interruption, reset the circuit breaker by pressing the push-button (F) START.

The breaking current is factory set to 2.5 A.

Designation	Description
A	Power in connecting terminal
B	Setting the breaking current
C	Release button
D	Power out connecting terminal
E	Test push-button
F	Reset button



#### Circuit breaker QF1

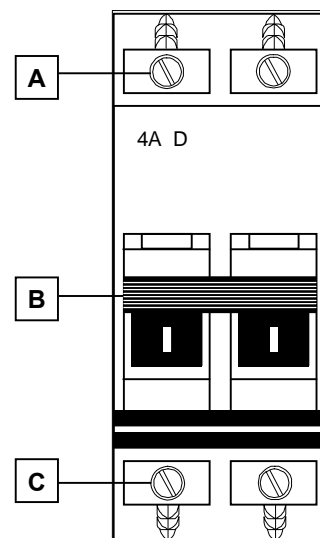
Circuit breaker QF1 protects the two phases, which power the transformer.

Should the latter require excessive power (>4 A), the breaker activates and lever (B) flips down.

The power supply to the transformer is immediately interrupted to avoid material damage.

After having located and repaired the problem causing this interruption, reset the lever of the circuit breaker.

Designation	Description
A	Power in connecting terminal
B	Lever on/off
C	Power out connecting terminal



## 4. HYDRAULIC EQUIPMENT

The guiding concept of the MOVE S2 bar feeder consists mainly in maintaining the bar suspended in an oil bath.

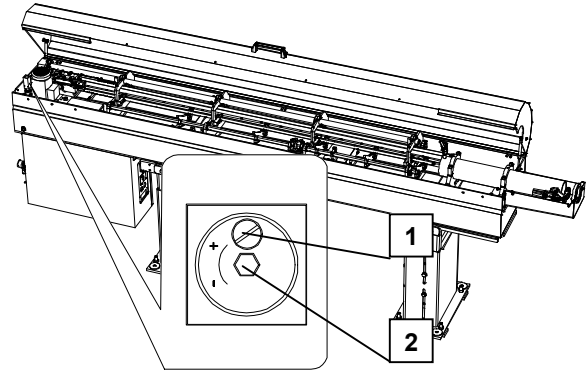
The hydraulic oil is contained in the machine itself. Aspirated by a pump motor, it is injected into the front rest and the guiding blocks.

A pressure switch measures the pressure at the outlet of the pump.  
A level allows the monitoring of the filling rate of the hydraulic tank.

### 4.1. Setting

The pressure is constantly monitored by a pressure switch set at the factory at a point of release of 0.5 bar. It may be adjusted, if necessary, as follows

1. With a screwdriver, unscrew the locking screw (D).
2. Insert a hex head wrench (5 mm) into the center of the pressure switch (E).  
By turning clockwise, the release of the pressure switch will take place at a pressure higher than the original setting. Turning in the opposite direction, will produce the reverse.



1. When the adjustment is completed, retighten the locking screw (D).

### 4.2. Filling and draining

The bar feeder is delivered without oil. Depending on the machine length, hydraulic oil of the type indicated below must be provided by the client. Put oil directly in the hydraulic tank.

Viscosity equivalency table		
ISO VG 100	100 mm <sup>2</sup> /s (cSt) à 40°C	8°E à 50°C

Consult your supplier who will recommend the correct oil for you.

To drain the bar feeder, place a container with sufficient capacity underneath the tank, and unscrew the drain plug.



*A thicker oil (ISO VG 150) may, in certain cases, produce better results when guiding profiled bars.*

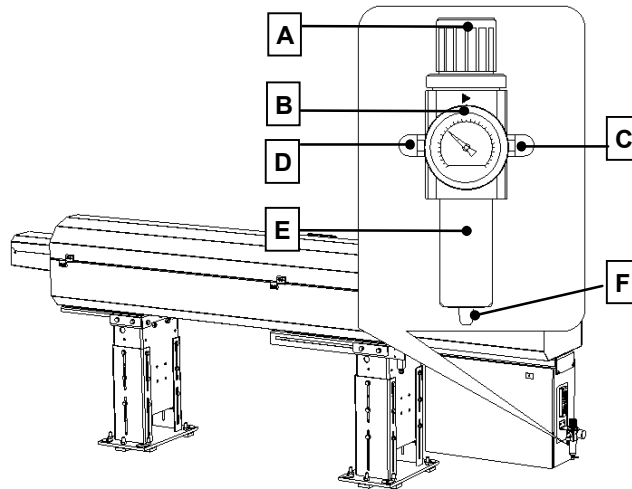
## 5. PNEUMATIC EQUIPMENT

The air is conditioned by a dedicated unit, to eliminate the humidity and protect the pneumatic components.

### 5.1. Pneumatic setup

The air filtering device serves to filter air and to set its pressure before it is distributed into the pneumatic circuit of the bar feeder.

The air must be furnished at a maximum pressure of 6 bar (minimum 5 bar), and whenever possible, clean and dry.



Designation	Description
A	Pressure regulator
B	Pressure gauge
C	Inlet
D	Regulated pressure outlet
E	Decanter
F	Automatic purging

### 5.2. Connection

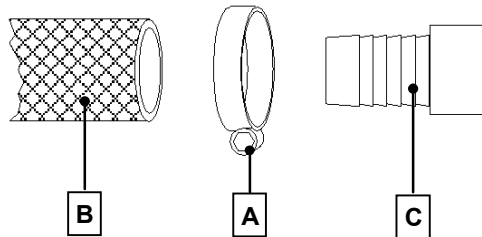
The pneumatic connection (C) is located behind the control cabinet.

For the pneumatic connections of the bar feeder, the customer must provide a hose (B) with an inside diameter of 1/2" (12.7 mm). For USA, 3/8" (9.5 mm).

Provide an air hose long enough to allow the complete travel (500 mm) of the retraction system.

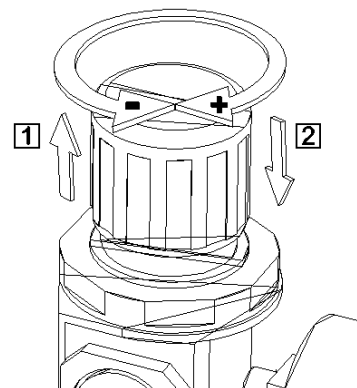
When the hose is connected, it should not lie on the ground because it could become damaged.

1. Place clamp (A) around hose (B).
2. Insert fitting (C) into hose.
3. Tighten the flange (A) to make it airtight.



### 5.3. Settings

1. Unlock the adjusting knob by pulling it upward.
2. To increase the pressure, turn it clockwise. To decrease it, turn it in the opposite direction. The operational pressure should be set at 5 bar.
3. When the settings are done, lock the adjuster by pushing it downward.

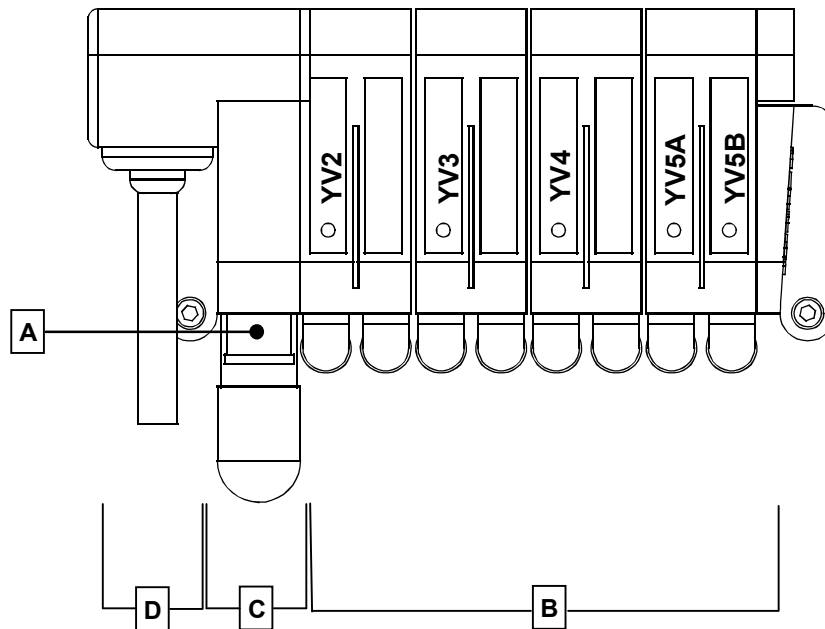


## 5.4. Pneumatic valve battery

### 5.4.1. Description

The pneumatic battery includes the control and monitoring elements of the bar feeder pneumatic circuit.

### 5.4.2. Layout of the elements



Designation	Article no.	Description
A	3.583	Inlets
B	3.582	Outlets
C	3.580	Silencer
D	4.178	Control connection plug
YV 2	3.578	Valve for bar stock laying fingers
YV 3	3.578	Valve for air blast control
YV 4	3.578	Electro valve pusher guide
YV5A	3.579	Valve Switch SQ1 protection . pusher lift valve
YV5B		

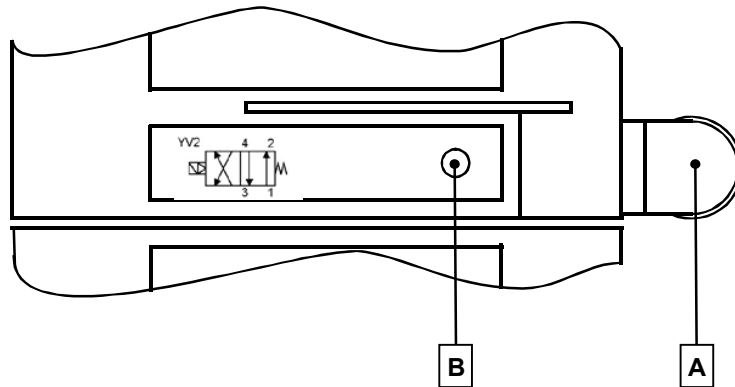
## 5.5. Description of the elements

### 5.5.1. Solenoid valves

Directly controlled by the PLC, the electro-valves activate the pneumatic cylinders.

By pressing a key (B), the pneumatic cylinders can be activated manually. This function may prove to be useful during tests or maintenance.

When the (B) key is released, the pneumatic cylinder returns to its resting position (except for pneumatic cylinders activated by 2 electro-valves).



Designation	Description
A	Air outlet
B	Manual activation key

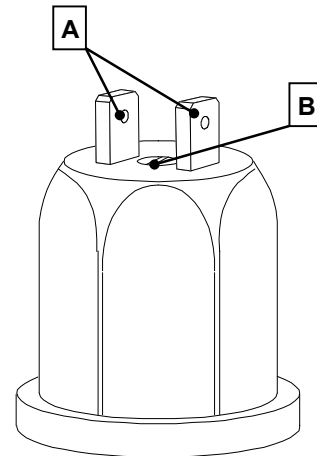
### 5.5.2. Air pressure switch

To guarantee an optimal work of the bar feeder, the service pressure must be at least 5 bar (75 psi).

The pressure switch serves to confirm that this pressure is present and adequate.

Setting:

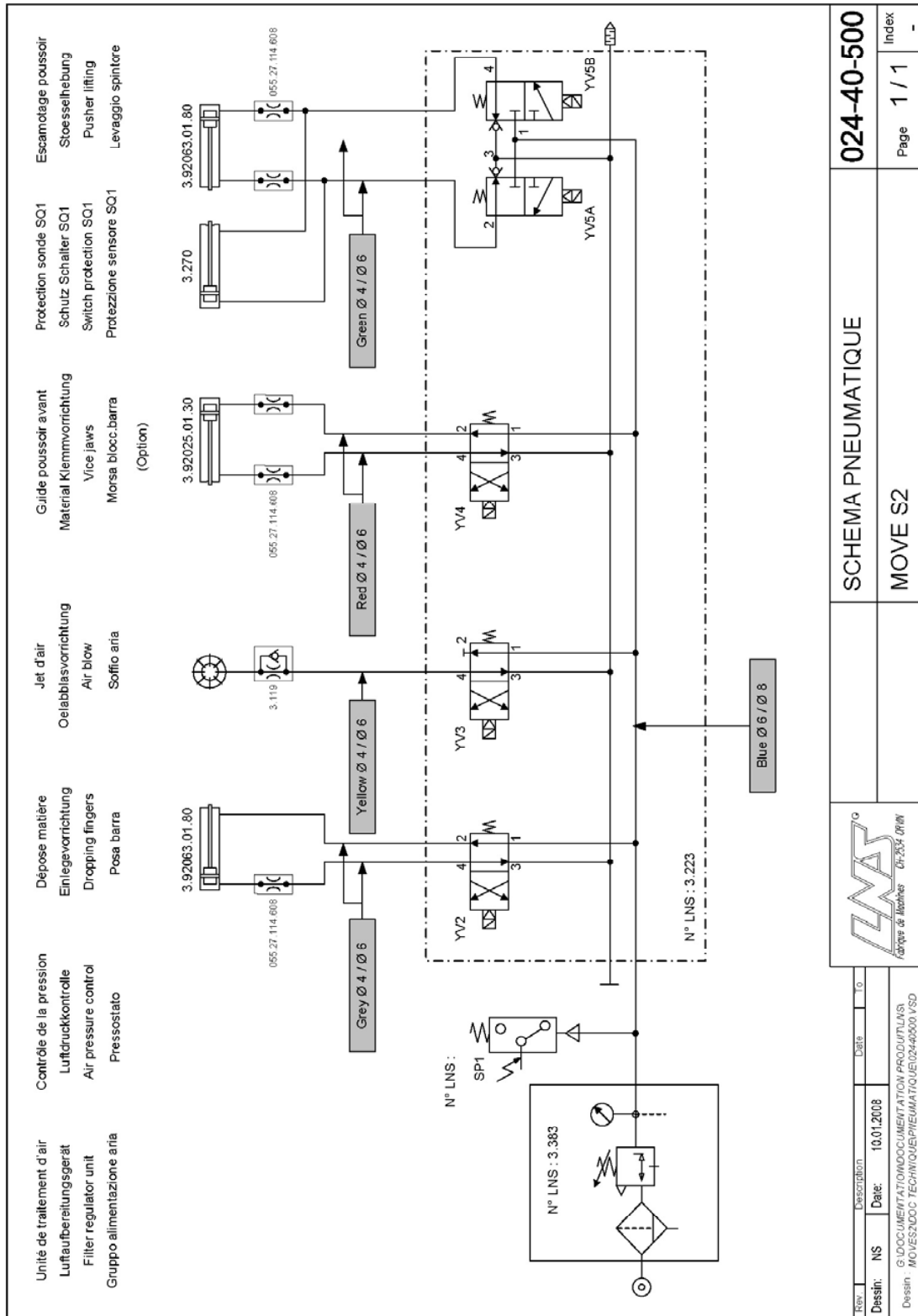
- By tightening screw (B), the point of release decreases; by loosening it, it increases.
- On the air valve assembly, decrease pressure and check on the manometer at the point of release. Adjust to 3 bar (45 psi).




Designation	Description
A	Terminal for electrical connections
B	Adjusting screw



5.6. Pneumatic drawing



Rev	Description	Date	TO	 Advys & Machines - CH-2014 ORIN G:\DOCUMENTATION\DOCUMENTATION PRODUIT\LNS\	<b>024-40-500</b> SCHEMA PNEUMATIQUE MOVE S2	Index
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## 6. SPARE PARTS

Designation	Article no.	Description
<b>Mechanics</b>		
-	024.14.054	Dropping finger
-	024.11.024	Pusher guide
-	024.11.054	Pusher guide
<b>Hydraulic</b>		
M1	2.210.150	Hydraulic pump motor
SP2	4.050	Hydraulic pressure switch
<b>Pneumatic</b>		
C	3.580	Silencer
<b>Electric</b>		
FU1	4.416	Fuse
KA1 - 6	4.606	Motor relay
KM1	4.507	Circuit breaker
K1	4.507	Safety chain control
R1 - R5	4.606	Interface relay

# CHAPTER 6

# APPENDICES

**APPENDIX A: ORDERING FORM**

*This form should be photocopied, duly filled out, and returned to your retailer or nearest LNS agent*

Company name:

Person in charge:

Address:

ZIP:

City:

Country:

Phone:

Fax:

Type of device:

Serial number:

Qty.	Order no.	Description

Expected delivery:

Location and date:

Signature and stamp of the company:

## APPENDIX B: PROGRAMMING EXAMPLE

### MAIN PROGRAM

N... #M+CODE %LATHE IN AUTOMATIC CYCLE+  
 N... SPINDLE STOP  
 N... COOLANT OFF  
 N... TURRET TO FEED IN POSITION  
 N... COLLET OPEN  
 N... TURRET TO FEED OUT POSITION

N... END OF BAR CHECK  
 (PROGRAM JUMP) >

N... CLOSE COLLET  
 N... CLEAR TURRET  
 N...

### PART PROGRAM

N... X, Z, G, F, T, S, M, ...  
 N... MACHINE PART  
 N... PARTS CATCHER IN (IF AVAILABLE)  
 N... CUT OFF  
 N... PARTS CATCHER OFF (IF AVAILABLE)  
 N...  
 N...  
 N... X, Z, G, F, T, S, M, ...  
 N...  
 N... END OF PROGRAM (LOOP)

### > SUB-PROGRAM

N... TURRET HOME  
 ... #M+CODE (DWELL/LOAD)  
 N... CLOSE COLLET  
 N... START SPINDLE  
 N... COLLANT ON  
 N... TOP CUT MATERIAL  
 N...  
 N... END OF SUB-PROGRAM  
 < (RETURN TO MAIN PROGRAM)

**Important:** The above is an example only. Programming may change according to the interface between the lathe and the bar feed.

**APPENDIX C: LNS ADRESSES**

LNS Europe : [www.lns-europe.com](http://www.lns-europe.com)  
LNS America : [www.lns-america.com](http://www.lns-america.com)  
LNS Asia : [www.lns-asia.com](http://www.lns-asia.com)