Instruction Manual

Express 332 S2

LNS America
4621 East Tech Drive
Cincinnati, Ohio 45245
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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 feed system 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 system, please refer to the chapter on the device to be set, for example: (see chapter *) or (see point *).

1.2. Captions
Whenever possible, the reference numbers contained in the instruction manual are shown with the LNS ordering number of the indicated element.

To make it easier to place an order of supplies, a form has been included in the annex at the end of this manual.

1.3. 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 system 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, sound or other, without the express written authorization of LNS SA, is prohibited. LNS SA disclaims all responsibility for errors which may be contained in this manual and the problems which may result therefore.

LNS SA and its subsidiaries cannot be made responsible for the debts, losses, expenses, or damage incurred, or suffered, by the buyer of this product, or a third party, following an accident, incorrect use, or misuse, or stemming from modifications, repairs, or transformations not authorized by LNS SA.

LNS SA and its subsidiaries cannot be held responsible for damage and problems arising from the use of options and products other than LNS products, or products approved by LNS SA.

The names of the products indicated in this manual are registered trademarks.

The instructions found in this manual are only for information; they are subject to change without notice.
3. DECLARATION OF COMPLIANCE

EC DECLARATION OF CONFORMITY

We declare that the following machinery complies with the next directives:
- Machinery Directive: 98/37/EC
- Low Voltage Directive: 2006/95/EC

Manufacturer:
LNS SA
Route de Frinvillier
CH- 2534 Orvin
Suisse

Compiling relevant technical information:
Plaseco Kurt De Pauw
Chemin des Petits-Clos 12
CH- 1744 Chénens
Suisse

Description of the machine:
Automatic barfeed system
Type:
EXPRESS 332 S2
Serial number:
(see number on official document)

The following transposed harmonised standards have been used:

- Concerning the Machinery Directive:
  - EN 14121 - 1 & 2: Safety of machinery – Risk assessment,
  - EN 12100 - 1 & 2: Safety of machinery – Basic concepts & principles,
  - EN 294: Safety of machinery – Safety distances,
  - EN 13850: Safety of machinery – Emergency stop equipment,
  - EN 953: Safety of machinery – Conception of movable guards,
  - EN 994-1: Safety of machinery – Safety related parts of control systems,
  - EN 1037: Safety of machinery – Prevention of unexpected start-up,
  - EN 1088: Safety of machinery – Interlocking devices,
  - EN 60204-1: Safety of machinery – Electrical equipment of machines,
  - CEI 60812: Safety of machinery – FMECA Analysis,

- Concerning the Low Voltage Directive:
  - IEC 60439-1/3: 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

Place and date:
Seal and signature:
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 feed system, 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 jewellery 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 system. 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.

- Don’t hit the barfeed when moving it, this could result in damages.

- The work area surrounding the bar feed system 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 system 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 EXPRESS 332 S2 bar feed system 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 feed system impossible. Safety switches keep the bar feed system from operating when these protections are open. The design of the switches, as well as their insertion into the bar feed system, makes it practically impossible to bypass them.

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

The LNS company, 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 barfeed system

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Emergency stop push button</td>
</tr>
<tr>
<td>B</td>
<td>Main access cover</td>
</tr>
<tr>
<td>SQ10</td>
<td>Safety switch of the retraction system (option)</td>
</tr>
<tr>
<td>SQ11</td>
<td>Safety switch of the main access cover</td>
</tr>
</tbody>
</table>
CHAPTER 2

TECHNICAL DATA
1. CHARACTERISTICS (*)

<table>
<thead>
<tr>
<th></th>
<th>2 m</th>
<th>3 m</th>
<th>12'</th>
<th>4 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>550 kg</td>
<td>650 kg</td>
<td>700 kg</td>
<td>750 kg</td>
</tr>
<tr>
<td>Dimensions</td>
<td>See pages 2-3 to 2-6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retract travel (option)</td>
<td>500 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum diameter</td>
<td>3 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum diameter</td>
<td>32 mm (34 mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum bar stock length</td>
<td>700 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum bar stock length</td>
<td>2200 mm</td>
<td>3200 mm</td>
<td>3800 mm</td>
<td>4200 mm</td>
</tr>
<tr>
<td>Minimum remnant length</td>
<td>100 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum remnant length</td>
<td>300 mm</td>
<td>400 mm</td>
<td>400 mm</td>
<td>400 mm</td>
</tr>
<tr>
<td>Pneumatical pressure</td>
<td>5 bar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air consumption</td>
<td>&lt; 10 l / loading cycle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main electrical power (Volt) *</td>
<td>3x 220 – 480</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>50 Hz – 60 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pushing force / torque</td>
<td>550 N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum feed rate</td>
<td>&gt; 100 m/min</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading cycle</td>
<td>30 – 35 sec.</td>
<td>35 – 40 sec.</td>
<td>35 – 40 sec.</td>
<td>35 – 40 sec.</td>
</tr>
<tr>
<td>Hydraulic oil</td>
<td>ISO 100/70 kg</td>
<td>ISO 100/80 kg</td>
<td>ISO 100/90 kg</td>
<td>ISO 100/100 kg</td>
</tr>
</tbody>
</table>

*) 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 feed system. Details on the dimensions of other parts or elements of the bar feed system will be furnished upon request.

A: Left (to-right) / front loading   B: Right (to left) / front loading
2.1. Left/front loading
2.2. Right/front loading
2.3. Left/front loading (2 m)
2.4. Right/front loading (2m)
### 3. LAYOUT OF THE ELEMENTS

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pusher (not visible)</td>
</tr>
<tr>
<td>B</td>
<td>Chain drive</td>
</tr>
<tr>
<td>C</td>
<td>Vise</td>
</tr>
<tr>
<td>D</td>
<td>Remnant control</td>
</tr>
<tr>
<td>E</td>
<td>Guiding channels</td>
</tr>
<tr>
<td>F</td>
<td>Remnant drop tray</td>
</tr>
<tr>
<td>G</td>
<td>Remote control</td>
</tr>
<tr>
<td>H</td>
<td>Main access cover</td>
</tr>
<tr>
<td>I</td>
<td>Front rest</td>
</tr>
<tr>
<td>J</td>
<td>Interface plug (according to OEM requirements – not visible)</td>
</tr>
<tr>
<td>K</td>
<td>Air blast</td>
</tr>
<tr>
<td>L</td>
<td>Positioning switch</td>
</tr>
<tr>
<td>M</td>
<td>Front stand</td>
</tr>
<tr>
<td>N</td>
<td>Retraction system (option)</td>
</tr>
<tr>
<td>O</td>
<td>Rear stand</td>
</tr>
<tr>
<td>P</td>
<td>Loading ramp</td>
</tr>
<tr>
<td>Q</td>
<td>Air filtering unit</td>
</tr>
<tr>
<td>R</td>
<td>Electrical cabinet</td>
</tr>
<tr>
<td>S</td>
<td>Pneumatic assembly</td>
</tr>
</tbody>
</table>
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 EXPRESS 332 S2 bar feed system 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 feed system.

1.2. Unpacking

For practical and safety reasons, the bar feed system must be unpacked in a spacious, well-lit location.

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 feed system 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 feed system is unpacked in the same way as when delivered on a pallet. The EXPRESS 332 S2 bar feed system is always delivered as follows:

- A pusher and guiding elements set is mounted in the barfeed system (A). Depending on the purchase order, other sets may be delivered in a separate box.

- The remote control (B) and the interface plug (C) are packaged in a separate box (D), with the technical documentation and the accessories.

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

### 1.3. Preparation for mounting

For mounting and installing the bar feed system, it is advisable to contact LNS or one of its agents. 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 feed system into the holes of the lifting plates.
- Place the hoist vertically above the bar feed system.
- Place the straps over the ends of the bars (B), then attach them to the hoist.
- Raise the hoist to tighten the straps.

- Remove the screws (A) holding the bar feed system to the pallet during transportation.
- Lift the bar feed system and remove the pallet. Ensure that the bar-feed system is balanced!
- Move the bar feed system, taking care that it remains horizontal and that no one is nearby or under the suspended load.
- Do not knock the bar feed system as you move it; this may damage it.
- Place the bar feed system 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 feed system should be taken into account. When placing the bar feed system, insert levelling plates (C) under the stands, one for each levelling screw (socket set screw).

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

The EXPRESS 332 S2 bar feed system is delivered completely 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 feed system, ensure that the lathe is stable and preferably levelled.

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 their local representative so they may take care of the bar feed system installation.

- If not already done, place a levelling plate (E) under each levelling screw. On each stand, loosen the lock nuts (A) of the levelling screws (B). Then, make sure that the weight of the bar feed system is evenly distributed over the 12 support points through the levelling plates (E).

- 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 of the bar feed system.

- Adjusting the central screws (C), set the height of the bar feed system. Normally, when the reference point is known, this adjustment is done at the factory.

- 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 SA or your 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 levelling screws should only be tightened after the bar feed system is anchored to the ground.
3. ANCHORING TO THE GROUND

Once the bar feed system 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 levelling screws.
- Remove the 4 (2+2) screws (C).

4. CONNECTING

Once the bar feed system has been aligned and anchored to the ground, the bar feeder must be connected to the interface of the lathe and compressed air needs to be connected. At this stage, the hydraulic tank may be filled.

- For the electrical connection, please see Chapter 4, Electrics.
- For the pneumatic connection, please see Chapter 5, Pneumatics.
- For filling the tank, please refer to Chapter 6, Hydraulics
CHAPTER 4

ELECTRICS
1. 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 their local representative.

1.1. Description

This chapter contains all of the elements regarding the electrical circuit of the bar feed system. 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.
1.2. Layout of the electrical elements on the bar feed system

<table>
<thead>
<tr>
<th>Designation</th>
<th>Article No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4.972</td>
<td>Remote control</td>
</tr>
<tr>
<td>B (*)</td>
<td></td>
<td>Electrical cabinet</td>
</tr>
<tr>
<td>M 1</td>
<td>2.189</td>
<td>Hydraulic pump motor</td>
</tr>
<tr>
<td>M 2</td>
<td>4.706</td>
<td>Servo motor</td>
</tr>
<tr>
<td>M 6</td>
<td>4.307</td>
<td>Automatic front rest motor</td>
</tr>
<tr>
<td>M 7</td>
<td>4.307</td>
<td>Bar selection motor</td>
</tr>
<tr>
<td>QS 1</td>
<td>4.242</td>
<td>Main disconnect switch</td>
</tr>
<tr>
<td>SP 1</td>
<td>3.636</td>
<td>Air pressure switch (integrated in the pressure gauge)</td>
</tr>
<tr>
<td>SP 2</td>
<td>4.050</td>
<td>Hydraulic pressure switch</td>
</tr>
<tr>
<td>SQ 1</td>
<td>4.772</td>
<td>Bar length measurement (optical cell)</td>
</tr>
<tr>
<td>SQ 3</td>
<td>4.968</td>
<td>Pusher support in open position switch</td>
</tr>
<tr>
<td>SQ 4</td>
<td>4.968</td>
<td>Pusher support in closed position switch</td>
</tr>
<tr>
<td>SQ 5</td>
<td>4.391</td>
<td>Pusher in reference position switch</td>
</tr>
<tr>
<td>SQ 10</td>
<td>4.484</td>
<td>Retract system safety switch (option)</td>
</tr>
<tr>
<td>SQ 11</td>
<td>4.763</td>
<td>Main access cover closed switch</td>
</tr>
<tr>
<td>SQ 12</td>
<td>4.772</td>
<td>Remnant control (optical cell)</td>
</tr>
<tr>
<td>SQ 13</td>
<td>4.391</td>
<td>Front rest referencing</td>
</tr>
<tr>
<td>SQ 14</td>
<td>4.391</td>
<td>Front rest pulse input</td>
</tr>
<tr>
<td>SQ 17</td>
<td>4.968</td>
<td>Switch guiding channel open</td>
</tr>
<tr>
<td>SQ 18</td>
<td>4.968</td>
<td>Switch guiding channel closed</td>
</tr>
<tr>
<td>SQ 20</td>
<td>4.391</td>
<td>Switch bar selection</td>
</tr>
</tbody>
</table>

(*) See following pages
1.3. Description of the electrical elements of the bar system

1.3.1. Hydraulic pump motor

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 their local representative.

It is strictly prohibited to make adjustments as long as the bar feed system 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 feed system 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 feed system 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 feed system on (engage QS1 and QM1).
2. ELECTRICAL CABINET

2.1. Layout of the elements in the electrical cabinet

<table>
<thead>
<tr>
<th>Designation</th>
<th>Article No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-</td>
<td>Interface terminal blocks X2</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>Valves terminal blocks X3 (YV1 – YV8)</td>
</tr>
<tr>
<td>C</td>
<td>-</td>
<td>Safety terminal blocks X1 (T1 – T11)</td>
</tr>
<tr>
<td>D</td>
<td>4.907</td>
<td>Programmable controller PCD3 (PLC)</td>
</tr>
<tr>
<td>AJ1</td>
<td>4.705</td>
<td>Servo amplifier 400W</td>
</tr>
<tr>
<td>FU1</td>
<td>4.419</td>
<td>Automatic front rest fuse 2A</td>
</tr>
<tr>
<td>K3</td>
<td>4.932</td>
<td>Safety contactor</td>
</tr>
<tr>
<td>K8</td>
<td>4.931</td>
<td>Safety control module</td>
</tr>
<tr>
<td>KA5</td>
<td>4.925</td>
<td>Automatic front rest motor opening M6 relay</td>
</tr>
<tr>
<td>KA6</td>
<td>4.925</td>
<td>Automatic front rest motor closing M6 relay</td>
</tr>
<tr>
<td>KA7</td>
<td>4.925</td>
<td>Bar selection relay</td>
</tr>
<tr>
<td>KA13</td>
<td>4.925</td>
<td>Main access cover relay</td>
</tr>
<tr>
<td>KM1</td>
<td>4.507</td>
<td>Hydraulic pump motor M1 relay</td>
</tr>
<tr>
<td>KS</td>
<td>4.925</td>
<td>Start relay</td>
</tr>
<tr>
<td>QF1</td>
<td>4.815</td>
<td>Circuit breaker 4 A</td>
</tr>
<tr>
<td>QM1</td>
<td>4.503</td>
<td>Main circuit breaker 2.5 to 4 A</td>
</tr>
<tr>
<td>QS1</td>
<td>4.242</td>
<td>Main disconnect switch</td>
</tr>
<tr>
<td>R1</td>
<td>4.925</td>
<td>Alarm relay</td>
</tr>
<tr>
<td>R2</td>
<td>4.925</td>
<td>Bar feeder loading cycle relay</td>
</tr>
<tr>
<td>R3</td>
<td>4.925</td>
<td>End of bar relay</td>
</tr>
<tr>
<td>R4</td>
<td>4.925</td>
<td>Automatic mode relay</td>
</tr>
<tr>
<td>R5</td>
<td>4.925</td>
<td>Auxiliary end of bar relay</td>
</tr>
<tr>
<td>R6</td>
<td>4.925</td>
<td>Reserved for option</td>
</tr>
<tr>
<td>R7</td>
<td>4.925</td>
<td>Reserved for option</td>
</tr>
<tr>
<td>R8</td>
<td>4.925</td>
<td>Reserved for option</td>
</tr>
<tr>
<td>T1</td>
<td>4.769</td>
<td>Transformer 1-ph</td>
</tr>
<tr>
<td>T2</td>
<td>4.779</td>
<td>24 VDC Power supply 150W</td>
</tr>
</tbody>
</table>
2.2. Description of the elements in the cabinet

2.2.1. Main disconnect switch QS1

In accordance with the requirements of the international IEC standards, when the main disconnect switch is at 0off, it interrupts the input of the three phases in the control cabinet of the bar feed system.

2.2.2. Main circuit breaker QM1

Circuit breaker QM1 interrupts the 3 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 reason, 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.

At the factory, the breaking current is set to 2.5 amperes.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Power in connecting terminal</td>
</tr>
<tr>
<td>B</td>
<td>Setting the breaking current</td>
</tr>
<tr>
<td>C</td>
<td>Release button</td>
</tr>
<tr>
<td>D</td>
<td>Power out connecting terminal</td>
</tr>
<tr>
<td>E</td>
<td>Test push-button</td>
</tr>
<tr>
<td>F</td>
<td>Reset button</td>
</tr>
</tbody>
</table>

2.2.3. Circuit breaker QF1 (4 Amps)

Circuit breaker QF1 protects the two phases, which power the transformer. Should the latter require excessive power (>4 Amps), the breaker activates and lever (B) flips down.

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

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

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Power in connecting terminal</td>
</tr>
<tr>
<td>B</td>
<td>Lever on/off</td>
</tr>
<tr>
<td>C</td>
<td>Power out connecting terminal</td>
</tr>
</tbody>
</table>
2.2.4. Transformers 230 V (T1) and 24 VDC (T2)

The transformers T1 and T2 power the entire low voltage network of the bar feed system, as well as a portion of the interface signals, (see section 3. INTERFACE in this chapter).

The transformer T1 has an output of 230 Volts which powers the amplifier of the SERVO motor

A fuse installed in a support protects the transformer T1 output.

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 220 to 480 volts, 50 or 60 Hz. Measure the power provided by the lathe, and, if necessary, adapt the cable on the power terminal block (A).

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Primary terminal block, 220V-480V / 50hz or 60 Hz ± 15%</td>
</tr>
<tr>
<td>B</td>
<td>Secondary terminal block, 230 V</td>
</tr>
<tr>
<td>C</td>
<td>Fuse (3.15 A)</td>
</tr>
</tbody>
</table>

The transformer T2 has an output of 24 VDC and powers the rest of the barfeed.

The transformer T2 output is protected by the fuse FU1 installed in a support in the electrical control cabinet.

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

By means of the SERVO amplifier, the programmable controller controls 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 axles do not need to be placed at zero when the bar feed system after powered up.

Although the batteries last for a relatively long time (4-7 years), it is advisable to keep spare ones 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 feed system is still powered up.

Procedure:
1. Raise cover (I), Pull out plug (D).
2. Ease clip to the right and remove the battery. The wires on the extremities of the battery connecting it to the switch are part of the battery.
3. Install the new battery inside the support, connect the plug and close the cover.

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

---

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>230 V + ground power supply</td>
</tr>
<tr>
<td>B</td>
<td>Power output to SERVO motor</td>
</tr>
<tr>
<td>C</td>
<td>Battery (ordering number 4.714)</td>
</tr>
<tr>
<td>D</td>
<td>Battery plug</td>
</tr>
<tr>
<td>E</td>
<td>Emergency stop contact</td>
</tr>
<tr>
<td>F</td>
<td>Encoder connecting plug</td>
</tr>
<tr>
<td>G</td>
<td>Programmable controller / SERVO amplifier connecting plug</td>
</tr>
<tr>
<td>H</td>
<td>Alarm and codes display of amplifier</td>
</tr>
<tr>
<td>I</td>
<td>Cover</td>
</tr>
</tbody>
</table>
2.2.6. Programmable controller (PLC)

The programmable controller (PLC) continuously scrutinizes all data from the remote control, probes, 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.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Information module</td>
</tr>
<tr>
<td>M1</td>
<td>Slot for software updates</td>
</tr>
<tr>
<td>M2</td>
<td>Slot for memory expansion (in use as standard)</td>
</tr>
</tbody>
</table>

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

**M1 slot:**

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 SA.

**M2 slot:**

This slot is used by a flash (blue) card as memory expansion. Do not remove the flash card unless instructed by LNS SA.
### 2.2.7. PLC inputs / outputs

<table>
<thead>
<tr>
<th>Input</th>
<th>Des.</th>
<th>Description</th>
<th>Output</th>
<th>Des.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I0</td>
<td>SQ1</td>
<td>Measuring cell</td>
<td>O32</td>
<td>YV1</td>
<td>Valve dropping bar stock</td>
</tr>
<tr>
<td>I1</td>
<td>SQ3</td>
<td>Pusher support open</td>
<td>O33</td>
<td>YV2</td>
<td>Valve air blast</td>
</tr>
<tr>
<td>I2</td>
<td>SQ4</td>
<td>Pusher support closed</td>
<td>O34</td>
<td>YV3</td>
<td>Valve remnant device clamping</td>
</tr>
<tr>
<td>I3</td>
<td>SQ5</td>
<td>Pusher in referencing position</td>
<td>O35</td>
<td>YV5A</td>
<td>Valve pusher support opening</td>
</tr>
<tr>
<td>I4</td>
<td></td>
<td></td>
<td>O36</td>
<td>YV5B</td>
<td>Valve pusher support closing</td>
</tr>
<tr>
<td>I5</td>
<td></td>
<td></td>
<td>O37</td>
<td>YV6</td>
<td>Guiding channel opening</td>
</tr>
<tr>
<td>I6</td>
<td>SQ11</td>
<td>Main access cover safety</td>
<td>O38</td>
<td>YV4</td>
<td>Valve protection SQ1 / Pusher lock in reference position</td>
</tr>
<tr>
<td>I7</td>
<td>SQ12</td>
<td>Remnant check</td>
<td>O39</td>
<td>YV6B</td>
<td>Guiding channel closing</td>
</tr>
<tr>
<td>I8</td>
<td>SQ13</td>
<td>Front rest referencing</td>
<td>O40</td>
<td>YV7A</td>
<td>Pusher locked up</td>
</tr>
<tr>
<td>I9</td>
<td>SQ17</td>
<td>Guiding channel open</td>
<td>O41</td>
<td>YV7B</td>
<td>Pusher released down</td>
</tr>
<tr>
<td>I10</td>
<td>SQ18</td>
<td>Guiding channel closed</td>
<td>O42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I11</td>
<td></td>
<td></td>
<td>O43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I12</td>
<td>SQ20</td>
<td>Bar selection</td>
<td>O44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I13</td>
<td></td>
<td></td>
<td>O45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I14</td>
<td></td>
<td></td>
<td>O46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I15</td>
<td></td>
<td></td>
<td>O47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I16</td>
<td>K1</td>
<td>Safety line relay</td>
<td>O48</td>
<td>KM1</td>
<td>Relay hydraulic pump</td>
</tr>
<tr>
<td>I17</td>
<td>SP2</td>
<td>Oil pressure switch</td>
<td>O49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I18</td>
<td>SQ10</td>
<td>Retraction safety switch (option)</td>
<td>O50</td>
<td>KA5</td>
<td>Relay front rest motor opening</td>
</tr>
<tr>
<td>I19</td>
<td></td>
<td></td>
<td>O51</td>
<td>KA6</td>
<td>Relay front rest motor closing</td>
</tr>
<tr>
<td>I20</td>
<td></td>
<td></td>
<td>O52</td>
<td>KA7</td>
<td>Relay bar selection</td>
</tr>
<tr>
<td>I21</td>
<td></td>
<td></td>
<td>O53</td>
<td>KA13</td>
<td>Main access cover relay</td>
</tr>
<tr>
<td>I22</td>
<td></td>
<td></td>
<td>O54</td>
<td>SON</td>
<td>Motor Servo ON</td>
</tr>
<tr>
<td>I23</td>
<td>SP1</td>
<td>Pneumatic pressure</td>
<td>O55</td>
<td>KS</td>
<td>Start relay</td>
</tr>
<tr>
<td>I24</td>
<td>A1</td>
<td>Clamping device signal</td>
<td>O56</td>
<td>R1</td>
<td>Alarm relay</td>
</tr>
<tr>
<td>I25</td>
<td>A2</td>
<td>Lathe in auto cycle</td>
<td>O57</td>
<td>R2</td>
<td>Relay bar feeder in loading cycle</td>
</tr>
<tr>
<td>I26</td>
<td>A3</td>
<td>Feed order</td>
<td>O58</td>
<td>R3</td>
<td>Relay end of bar</td>
</tr>
<tr>
<td>I27</td>
<td>A4</td>
<td>Push order</td>
<td>O59</td>
<td>R4</td>
<td>Relay automatic mode</td>
</tr>
<tr>
<td>I28</td>
<td>A5</td>
<td>Lathe’s safety door (K10)</td>
<td>O60</td>
<td>R5</td>
<td>Relay auxiliary end of bar</td>
</tr>
<tr>
<td>I29</td>
<td>A..</td>
<td>Programmable interface input</td>
<td>O61</td>
<td>R6</td>
<td>Option</td>
</tr>
<tr>
<td>I30</td>
<td>A..</td>
<td>Programmable interface input</td>
<td>O62</td>
<td>R7</td>
<td>Relay spindle interlock</td>
</tr>
<tr>
<td>I31</td>
<td>A..</td>
<td>Programmable interface input</td>
<td>O63</td>
<td>R8</td>
<td>Option</td>
</tr>
<tr>
<td>INTO</td>
<td>SQ14</td>
<td>Front rest pulse input</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. INTERFACE

Before turning the power on, check that the voltage of the bar feed system corresponds to that of the lathe. The voltage of the bar feed system is indicated on the identification plate (A).

3.1. Description

The interface cable(s), between the bar feed system 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 (500 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.
3.2. Connections

3.2.1. Power supply

Voltage: 3 x 220-480 V, 50 / 60 Hz + Ground (± 10%)

Maximum current:
- 3 x 220 V = 3 A
- 3 x 480 V = 1,5 A

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

In the case where the voltage supplied by the lathe does not match that provided for the barfeed, the following elements must be adapted:

a) Transformer T1
b) Hydraulic pump motor

The LNS bar feed systems are equipped with their own thermal protection systems (breakers, thermal relays and fuses, etc.). The power supply for the bar feed system 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 mm² (AWG 16).

3.2.2. Signals from the lathe to the barfeed system

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

- All wires for interface connections are numbered
- All bar feed systems are equipped with a power supply of +24 Vdc.

a) 24 V dc power supply

Corresponds to the +24 V of the bar feed system. 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 V dc of the bar feed system.
- All signals from the bar feed system to the lathe shall be powered by the +24 V dc of the lathe.

For the other types of connections, please contact LNS S.A., 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 feed system. XT8-XT9 corresponds to the Emergency Stop signal of the lathe. If the circuit is open, the bar feed system will go into an Emergency Stop mode.

When the lathe is in an Emergency Stop mode, or if the safety line of the bar feed system is interrupted, an alarm will go off and the R1 relay of the bar feed system 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 the lathe is of twin spindle 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.

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

**a) R1 alarm relay**

When the bar feed system 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.

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

**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 automatic mode relay**

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

e) **Emergency stop button of the bar feed system (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.

### 3.2.4. Options

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

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) **R6 bar stock magazine empty relay**

Contact of relay R6 (optional). Relay R6 engages after verification of the presence of a bar during the loading cycle of a new bar.

### 3.2.5. 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 feed system must also be under the Emergency Stop mode, and vice-versa.
- If the bar feed system 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 5

PNEUMATICS
1. PNEUMATICAL EQUIPMENT

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

1.1. Description

The following automatic movements of the bar feed system are done via pneumatic elements, namely:

- Bar stock loading into the guiding channels
- Guiding channel/pusher support opening and closing
- Material clamping (bar stock insertion/remnant extraction)
- Air blast

To guarantee an optimal operation of the bar feed system, a minimum pressure of 5 bars (75 PSI), and a maximum pressure of 6 bars (90 PSI) is mandatory.

1.2. Layout of the pneumatic elements

<table>
<thead>
<tr>
<th>Designation</th>
<th>Article no.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3.636</td>
<td>Air filtering unit with air pressure switch</td>
</tr>
<tr>
<td>B</td>
<td>3.655</td>
<td>Valve battery</td>
</tr>
<tr>
<td>C</td>
<td>(*)</td>
<td>Air blast</td>
</tr>
<tr>
<td>D</td>
<td>3.98050.A.40</td>
<td>Pneumatic cylinder Remnant device clamping</td>
</tr>
<tr>
<td>E</td>
<td>3.96040.A.50</td>
<td>Pneumatic cylinder Guiding channel opening/closing</td>
</tr>
<tr>
<td>F</td>
<td>3.97040.B.50</td>
<td>Pneumatic cylinder Bar stock loading</td>
</tr>
<tr>
<td>G</td>
<td>3.95025.B.40</td>
<td>Pneumatic cylinder Protection switch SQ1</td>
</tr>
<tr>
<td>H</td>
<td>3.95025.B.20</td>
<td>Pneumatic cylinder Pusher lock in reference position</td>
</tr>
<tr>
<td>I</td>
<td>3.96040.A.50</td>
<td>Pneumatic cylinder Pusher support opening/closing</td>
</tr>
<tr>
<td>J</td>
<td>3.95025.B.40</td>
<td>Pneumatic cylinder Pusher lift locked up / released down</td>
</tr>
</tbody>
</table>

(*) Certain less visible elements are shown more clearly in Chapter 7/ General Description.
2. AIR FILTERING UNIT

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

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

2.2. Layout of the elements

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pressure regulator</td>
</tr>
<tr>
<td>B</td>
<td>Pressure gauge with pressure switch</td>
</tr>
<tr>
<td>C</td>
<td>Inlet</td>
</tr>
<tr>
<td>D</td>
<td>Regulated pressure outlet</td>
</tr>
<tr>
<td>E</td>
<td>Decanter</td>
</tr>
<tr>
<td>F</td>
<td>Automatic purging</td>
</tr>
</tbody>
</table>

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

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

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.

2.4. Settings
1. Unlock the adjusting knob by pulling it upward.
   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.
2. When the settings are done, lock the adjuster by pushing it downward.
3. PNEUMATIC VALVE BATTERY

3.1. Description
The pneumatic battery includes the control and monitoring elements of the bar feed system pneumatic circuit.

3.2. Layout of the elements

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Inlets</td>
</tr>
<tr>
<td>B</td>
<td>Outlets</td>
</tr>
<tr>
<td>C</td>
<td>Silencer</td>
</tr>
<tr>
<td>D</td>
<td>Control connection plug</td>
</tr>
<tr>
<td>YV1</td>
<td>Valve bar stock loading</td>
</tr>
<tr>
<td>YV 2</td>
<td>Valve air blast</td>
</tr>
<tr>
<td>YV 3</td>
<td>Valve remnant device</td>
</tr>
<tr>
<td>YV 4</td>
<td>Valve protection switch SQ1 / Pusher lock in reference position</td>
</tr>
<tr>
<td>YV 5A</td>
<td>Valve opening pusher support</td>
</tr>
<tr>
<td>YV 5B</td>
<td>Valve closing pusher support</td>
</tr>
<tr>
<td>YV 6A</td>
<td>Valve opening guiding channel</td>
</tr>
<tr>
<td>YV 6B</td>
<td>Valve closing guiding channel</td>
</tr>
<tr>
<td>YV 7A</td>
<td>Valve pusher lift locked up</td>
</tr>
<tr>
<td>YV 7B</td>
<td>Valve pusher released down</td>
</tr>
</tbody>
</table>
3.3. Description of the elements

3.3.1. Electro-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 manoeuvre 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).

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Air outlet</td>
</tr>
<tr>
<td>B</td>
<td>Manual activation key</td>
</tr>
</tbody>
</table>

3.3.2. Air pressure switch
To guarantee an optimal work of the bar feed system, the service pressure must be at least 5 bars (75 Psi). The pressure switch serves to confirm that this pressure is present and adequate.

The air pressure switch is directly integrated into the pressure gauge.

Set up procedure for the pressure switch:
- Remove the glass of the pressure gauge
- With a screwdriver, turn the setting screw
- Place back the glass
4. PNEUMATIC DIAGRAMS
CHAPTER 6

HYDRAULICS
1. HYDRAULIC EQUIPMENT

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

1.1. Description

The guiding concept of the EXPRESS 332 S2 bar feed system 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.

1.2. Layout of the elements

<table>
<thead>
<tr>
<th>Designation</th>
<th>Article No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.216</td>
<td>Oil gauge</td>
</tr>
<tr>
<td>B</td>
<td>3.445</td>
<td>Oil supply to the guiding channels (not shown here)</td>
</tr>
<tr>
<td>C</td>
<td>3.445</td>
<td>Front rest supply tube</td>
</tr>
<tr>
<td>D</td>
<td>3.124</td>
<td>Drain plug (under the hydraulic tank)</td>
</tr>
<tr>
<td>M1</td>
<td>2.189</td>
<td>Hydraulic pump motor</td>
</tr>
<tr>
<td>SP2</td>
<td>4.050</td>
<td>Pressure control switch</td>
</tr>
</tbody>
</table>
1.3. 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 (5mm) 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.
3. When the adjustment is completed, retighten the locking screw (D).

1.4. Filling and draining

The bar feed system is delivered without oil. A minimum quantity of hydraulic oil of the type indicated below must be provided by the client. The oil must be poured directly into the machine.

<table>
<thead>
<tr>
<th>Barfeed version</th>
<th>2 m</th>
<th>3 m</th>
<th>12'</th>
<th>4 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic oil</td>
<td>ISO 100/50 L</td>
<td>ISO 100/60 L</td>
<td>ISO 100/60 L</td>
<td>ISO 100/60 L</td>
</tr>
</tbody>
</table>

**Viscosity equivalency table**

<table>
<thead>
<tr>
<th>ISO 100</th>
<th>100 mm²/s (cSt) at 40°C</th>
<th>DIN 68</th>
<th>8°E to 50°C</th>
</tr>
</thead>
</table>

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

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

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

2.1. Symbols

The following table represents the hydraulic symbols used, and their description:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="M1" /></td>
<td>Hydraulic pump motor</td>
<td>M1</td>
</tr>
<tr>
<td><img src="image" alt="SP2" /></td>
<td>Pressure control</td>
<td>SP2</td>
</tr>
<tr>
<td><img src="image" alt="A" /></td>
<td>Hydraulic tank (bodywork)</td>
<td>A</td>
</tr>
<tr>
<td><img src="image" alt="B" /></td>
<td>Guiding element</td>
<td>B</td>
</tr>
<tr>
<td><img src="image" alt="C" /></td>
<td>Front rest</td>
<td>C</td>
</tr>
</tbody>
</table>

2.2. Hydraulic diagram
CHAPTER 7

GENERAL DESCRIPTION
1. BAR MAGAZINE

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

1.1. Description

<table>
<thead>
<tr>
<th>Designation</th>
<th>Article no.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>---</td>
<td>Loading ramp</td>
</tr>
<tr>
<td>B</td>
<td>---</td>
<td>Rear limiter</td>
</tr>
<tr>
<td>C</td>
<td>---</td>
<td>Diameter limiter</td>
</tr>
<tr>
<td>D</td>
<td>---</td>
<td>Bar selector</td>
</tr>
<tr>
<td>E</td>
<td>---</td>
<td>Air cylinder for bar selection</td>
</tr>
</tbody>
</table>

1.2. Setting

The setting of the bar selection is done automatically (on the remote control) when entering the parameters for a new production job.

1. Enter the new diameter of the bar stocks to load when asked on the remote control. The bar selectors are relocated according to the new value.

2. Load the bar stocks on the loading ramp.

3. Set manually the diameter limiters to ensure no bar can jump over the others. (Clearance of around 1 mm)
2. GUIDING ZONE

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

2.1. Guiding channel assembly

The guiding zone consists of a fixed lower aluminium profile housing the guiding elements (channels). This zone is closed by a movable cover. A pusher assembly with a collet holding the bar end guides the bar forth and back. Hydraulic oil is injected into the channels and distributed all along the bar stock. An oil bath is created around the rotating bar / pusher, which is thus kept at the center of the guiding axis. An automatic front rest maintains the bar for optimal performance.

Sets of guidance elements of different diameters are available.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Article No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-</td>
<td>Guiding channel (*)</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>Oil supply</td>
</tr>
<tr>
<td>C</td>
<td>3.96040.A.50</td>
<td>Pneumatic cylinder guiding elements closing / opening</td>
</tr>
<tr>
<td>D</td>
<td>-</td>
<td>Guiding elements locking system</td>
</tr>
<tr>
<td>E</td>
<td>4.968</td>
<td>Proximity switch guiding element opening / closing (SQ 17, SQ 18)</td>
</tr>
</tbody>
</table>

(*) Some elements are explained in more details in the following paragraphs.
2.3. Guiding elements (channels)

<table>
<thead>
<tr>
<th>Channel size</th>
<th>Complete set of guiding channels (Qty. x guiding channels)</th>
<th>Front rest element</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>332.030.013/2 (4x 028.30.413)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.013/3 (6x 028.30.413)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.013/12 (7x 028.30.413)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>332.030.023/2 (4x 028.30.423)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.023/3 (6x 028.30.423)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.023/12 (7x 028.30.423)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>332.030.033/2 (4x 028.30.433)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.033/3 (6x 028.30.433)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.033/12 (7x 028.30.433)</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>332.030.043/2 (4x 028.30.443)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.043/3 (6x 028.30.443)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.043/12 (7x 028.30.443)</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>332.030.053/2 (4x 028.30.453)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.053/3 (6x 028.30.453)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.053/12 (7x 028.30.453)</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>332.030.063/2 (4x 028.30.463)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.063/3 (6x 028.30.463)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.063/12 (7x 028.30.463)</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>332.030.073/2 (4x 028.30.473)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.073/3 (6x 028.30.473)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.073/12 (7x 028.30.473)</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>332.030.083/2 (4x 028.30.483)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.083/3 (6x 028.30.483)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.083/12 (7x 028.30.483)</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>332.030.093/2 (4x 028.30.493)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.093/3 (6x 028.30.493)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.093/12 (7x 028.30.493)</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>332.030.103/2 (4x 032.30.013)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.103/3 (6x 032.30.013)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.103/12 (7x 032.30.013)</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>332.030.113/2 (4x 032.30.023)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.113/3 (6x 032.30.023)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.113/12 (7x 032.30.023)</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>332.030.123/2 (4x 032.30.033)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.123/3 (6x 032.30.033)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>332.030.123/12 (7x 032.30.033)</td>
<td></td>
</tr>
</tbody>
</table>

The guiding channels from the LNS Express 220 and Express 332 can be used in the Express 332 S2; however, for full compatibility, you may need an adapter for the small channel sizes (channels 8 to 29 mm). Additionally, you may have to order separate channels to complete the necessary quantity of items.
2.4. Pusher

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

To change the guiding elements and the pusher, please refer to chapter 8, section 3.1.1. Guiding elements adaptation.

The pusher (C) is laying on the guiding channels (A) and is 1 mm littler than the guiding channels. When the guiding zone is closed, a flag (B) ensures the connection with the chain.

The pusher is used to bring the bar stock into production cycle, follow the current position of the bar stock when working in swiss type lathes, and retract the remnant into the barfeed system for evacuation. Through adapting parts (E+F), each rotating sleeve (D) may be equipped with different pushers (C) and collets (F) of different diameters (see table below). When the guiding zone cover is opened, the pusher is lifted off with the cover.

Depending on the diameter of the bars to be guided, choose the appropriate diameter of the guiding elements; assemble the pusher according to the chart below.

Important: The performance of the guidance is determined by the clearance between the bar diameter and the guiding channels. A gap of 1 mm gives the best results.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Flag</th>
<th>Pusher</th>
<th>Rotating sleeve</th>
<th>Adaptation + Collet</th>
<th>Ø Bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø8</td>
<td>For channel Ø8 to Ø14</td>
<td>Ø7 332.31.094</td>
<td>Ø7 015.15.1064</td>
<td>Max. Ø7</td>
<td>3 - 5</td>
</tr>
<tr>
<td>Ø11</td>
<td>L/F: 332.031.044 R/F: 332.031.054</td>
<td>Ø10 332.31.104</td>
<td>Ø10 015.31.013/10</td>
<td>Max. Ø10</td>
<td>3 - 8</td>
</tr>
<tr>
<td>Ø14</td>
<td>Ø12 332.31.114</td>
<td>Ø10 015.31.013/10</td>
<td>Max. Ø12</td>
<td>3 - 10</td>
<td></td>
</tr>
<tr>
<td>Ø17</td>
<td>Ø16 332.31.124</td>
<td>Ø15 015.31.013/15</td>
<td>Max. Ø16</td>
<td>5 - 14</td>
<td></td>
</tr>
<tr>
<td>Ø19</td>
<td>Ø18 332.31.144</td>
<td>Ø15 015.31.013/15</td>
<td>Max. Ø18</td>
<td>8 - 16</td>
<td></td>
</tr>
<tr>
<td>Ø21</td>
<td>For channel Ø17 to Ø29</td>
<td>Ø20 332.31.164</td>
<td>Ø20 015.30.103.013/200</td>
<td>Max. Ø20</td>
<td>8 - 18</td>
</tr>
<tr>
<td>Ø23</td>
<td>L/F: 028.031.314 R/F: 028.031.334</td>
<td>Ø22 332.31.174</td>
<td>Ø20 015.30.103.013/200</td>
<td>Max. Ø22</td>
<td>10 - 20</td>
</tr>
<tr>
<td>Ø27</td>
<td>Ø26 332.31.194</td>
<td>Ø20 015.30.103.013/200</td>
<td>Max. Ø26</td>
<td>20 - 24</td>
<td></td>
</tr>
<tr>
<td>Ø29</td>
<td>Ø28 332.31.214</td>
<td>Ø20 015.30.103.013/200</td>
<td>Max. Ø28</td>
<td>20 - 26</td>
<td></td>
</tr>
<tr>
<td>Ø31</td>
<td>For channel Ø31 to Ø35</td>
<td>Ø30 332.31.234</td>
<td>Ø25 015.30.15.814</td>
<td>Max. Ø30</td>
<td>12 - 28</td>
</tr>
<tr>
<td>Ø33</td>
<td>L/F: 032.031.074 R/F: 032.031.054</td>
<td>Ø32 332.31.254</td>
<td>Ø25 015.30.15.814</td>
<td>Max. Ø32</td>
<td>12 - 30</td>
</tr>
<tr>
<td>Ø35</td>
<td>Ø34 332.31.274</td>
<td>Ø25 015.30.15.814</td>
<td>Max. Ø34</td>
<td>15 - 32</td>
<td></td>
</tr>
</tbody>
</table>
The pushers from the LNS Express 332 can be used in the Express 332 S2; however, in this case the useable pusher length is limited to 1220 mm.

<table>
<thead>
<tr>
<th>Pusher version</th>
<th>Pusher length (LP)</th>
<th>Useable length (LPU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXPRESS 332</td>
<td>1596 mm</td>
<td>1220 mm</td>
</tr>
<tr>
<td>EXPRESS 332 S2</td>
<td>1790 mm</td>
<td>1470 mm</td>
</tr>
</tbody>
</table>

A mechanical modification is required to use these pushers in the Express 332 S2: please contact your LNS agent for further information.

2.5. Loading finger

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

To change the guiding elements and the pusher, please refer to chapter 8, section 3.1.1. Guiding elements adaptation.

The loading finger is used to bring the bar stock into pusher collet insertion.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Loading Finger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø8</td>
<td>Ø8 Left/Front: 332.031.034</td>
</tr>
<tr>
<td>Ø11</td>
<td>Ø11 Right/Front: 332.031.064</td>
</tr>
<tr>
<td>Ø14</td>
<td>Ø14</td>
</tr>
<tr>
<td>Ø17</td>
<td>Ø17 332.031.074/17</td>
</tr>
<tr>
<td>Ø19</td>
<td>Ø19 332.031.074/19</td>
</tr>
<tr>
<td>Ø21</td>
<td>Ø21 332.031.074/21</td>
</tr>
<tr>
<td>Ø23</td>
<td>Ø23 332.031.024/23</td>
</tr>
<tr>
<td>Ø27</td>
<td>Ø27 332.031.024/27</td>
</tr>
<tr>
<td>Ø29</td>
<td>Ø29 332.031.024/29</td>
</tr>
<tr>
<td>Ø31</td>
<td>Ø31 332.031.024/31</td>
</tr>
<tr>
<td>Ø33</td>
<td>Ø33 332.031.024/33</td>
</tr>
<tr>
<td>Ø35</td>
<td>Ø35 332.031.024/35</td>
</tr>
</tbody>
</table>
2.6. Guiding elements in the front rest

The guiding channels are sensitive to corrosive products. Please do not wipe or clean the channels with any corrosive detergent. Use a dry cloth only to wipe the oil off the channels.

To change the guiding elements and the pusher, the procedure on chapter 8/point 3.1.1. must be applied.

<table>
<thead>
<tr>
<th>Guiding element shape</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Guiding element" /></td>
<td>For round bar stocks, the standard guiding elements are automatically set to the best position.</td>
</tr>
<tr>
<td><img src="image2.png" alt="Guiding element" /></td>
<td>For profiled bar stocks, the best performance is reached with special guiding elements adapted to the bar stock outer diameter. The best guiding quality is determined by guiding elements 1 mm bigger than bar stock diameter.</td>
</tr>
</tbody>
</table>

2.7. Connecting parts to the lathe

1. Telescopic tube, depending on the maximum spindle stroke
2. Adaptation parts depending on the spindle back design
3. Guiding bushing depending on the guiding reduction tubes diameter
3. CHAIN DRIVE

3.1. Description
The chain drive is controlled by a servomotor (M2) piloting all of the forward and backward movements of the pusher, the insertion and extraction movements of the bar in the collet.

3.2. Layout of the elements

3.3. Chain
It is possible that after a certain amount of use, the chain (A) needs to be tightened.

Should the chain tension be adjusted, make sure that while adjusting, the chain remains under tension in order not to lose the reference point. Should the reference point be lost, call for service assistance.

Procedure:

- Switch the bar feed system to STOP mode on the remote control.
- Open the main access cover.
- On the front rest system, loosen the lock nut (A) of the adjusting screw (B).
- Loosen gently the big locking nut (C) of the gearwheel.
- With a torque wrench, apply a torque of 0.8 Nm on the adjusting screw (B).
- When done, tighten the big locking nut (C) of the gearwheel.
- Lock the system with the lock nut (A) of the adjusting screw (B).
4. REMNANT EXTRACTION SYSTEM

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

4.1. Description

The vice serves to insert and to extract material from the collet of the bar feed system.

Independently of the material, the diameter, or the bar profile, the clamping jaws are invariably the same and do not require any adjustment. The vise of the EXPRESS 332 S2 bar feed system allows the extraction of remnants of from 100 mm to 400 mm long (300mm for the 2m version).

4.2. Layout of the elements

<table>
<thead>
<tr>
<th>Designation</th>
<th>Article No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>332-005-013</td>
<td>Bar stock clamping device</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>Remnant extraction drawer</td>
</tr>
<tr>
<td>SQ12</td>
<td>4.772</td>
<td>Remnant control (optical cell)</td>
</tr>
</tbody>
</table>
4.3. Replacement of the blades

The clamping blades (Nr. 332.05.074) must be replaced when worn out. To do this:

1. Cut the main power off.
2. Close the air supply, unplug the air hose if necessary to empty the air circuit.
3. Once there is no air in the cylinder, the blades can be moved by hand in closed position.
4. Unscrew the 2 fastening screws and remove the worn out clamping blades (A, B, C and D).
5. Install the new blade according to the drawing below, and secure them with the fastening screws.
6. Plug the air back, set the air pressure to 5 bar.
7. Switch the main power on.

4.4. Material presence control

Depending on the sequence of the bar feed system and in order to prevent damages to material, a control system verifies that there is no material in the collet. Bar presence check consists of the optical cell (A) located in front of the vise (B).

The control is carried out as follows:

- the optical switch first determinates if the remnant has been extracted out of the spindle
- the optical switch then determinates if the remnant has been properly ejected out of the bar feeder.
5. AUTOMATIC FRONT REST

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

For working of other bar stock shapes than round, the guiding elements need to be adapted.

5.1. Description

Located at the front of the bar feeder, the automatic front rest stabilizes the stock guiding, even when the gap in the guiding elements is big.

A robust chassis contains 2 V-shaped guiding elements (B) made of plastic material. The automatic front rest is supplied with oil during the whole automatic cycle. At the front, the oil is collected by centrifugal effect. An air blast (A) located just before the exit pushes away the resting oil. The rest opening is actuated by an electrical motor (C) and controlled by the PLC.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Article No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
<td>Cover (not shown)</td>
</tr>
<tr>
<td>A</td>
<td>-</td>
<td>Air blast</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>Guiding element (see also point 2.6. in this chapter)</td>
</tr>
<tr>
<td>C</td>
<td>4.307</td>
<td>Motor</td>
</tr>
<tr>
<td>D</td>
<td>-</td>
<td>Oil pan (not shown)</td>
</tr>
<tr>
<td>E</td>
<td>4.391</td>
<td>Rest referencing proximity switch</td>
</tr>
<tr>
<td>F</td>
<td>4.391</td>
<td>Closing / opening counting proximity switch</td>
</tr>
</tbody>
</table>

5.2. Setup

The automatic front rest works as follows:
- **Closed position:** holding and guiding the bar stock
- **Open position:** holding and guiding the pusher

The guiding elements are depending on the bar stock shape; for round bar stock, they don’t need to be replaced.

The closed and open positions are automatically set up by entering the pusher and bar stock diameter in the parameters. Each time the guiding zone is opened, the front rest searches for its referencing position.
6. RETRACTION DEVICE (option)

It is strictly prohibited to use the retraction system before the bar feed system is anchored to the ground. Please read the safety instructions provided 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 lathe and the bar feed system are long enough, and disconnect any telescopic tube from the back of the spindle.

6.1. Description

When a lathe is equipped with a bar feed system, certain elements (motors, spindle reduction tubes, etc.) become inaccessible, and sometimes it is difficult, or even impossible, to proceed with their maintenance.

To facilitate these tasks, the EXPRESS 332 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 feed system is in working position.

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

6.2. Operation

Conditions:
- Bar feed system in MAN or STOP mode.
- No bar between the bar feed system and the lathe
- Pusher inside the bar feed system
- The area around the bar feed system must be clear

Procedure:

1. Loosen the 4 lock screws (A) on the front side of the stand.
2. Loosen and remove the 2 lock screws (B) behind the stands.
3. Pull the bar feed system back.
4. After completing the maintenance operations, bring the bar feed system back in working position, lock the side screws (A) and the screws (B). (max 75 Nm)
1. POWERING UP

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

The motor of the EXPRESS 332 S2 bar feed system is equipped with a built-in absolute encoder that continuously controls the position of the pusher.

When the bar feed system is powered down or there is a power failure, this position is kept in the memory by the PLC.

When powering up, the value saved is immediately taken into account, thus avoiding any input from the beginning. The status parameters saved in the PLC prior to powering down are then checked by the PLC which analyses them. The latter then gives the operator access only to those handling operations, which should be undertaken.

To power up the bar feed system, turn (1) the switch handle to the right, to the On position.

To power down, turn the switch to the left, to the Off position.

The main switch can be locked with a padlock. This way, it is impossible to turn the bar feed system on.

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

The ergonomic and user-friendly remote control with a clear built-in display facilitates the handling of the bar feed system. Depending on the sequence under way, the bar feed system 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 feed system 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), directional keys and numeric pad (C), modes buttons with STOP, MENU and HELP buttons (D), and the emergency button (E).
2.1. Display

The liquid crystal display with touchscreen function provides the operator with all the necessary data, both for handling the bar feed system and for maintenance.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Signification</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOP</td>
<td>Access to the STOP mode</td>
</tr>
<tr>
<td></td>
<td>Access to the Main Menu screen</td>
</tr>
<tr>
<td></td>
<td>Referencing position</td>
</tr>
<tr>
<td></td>
<td>Switch to automatic mode</td>
</tr>
<tr>
<td></td>
<td>Stop after machining one bar stock</td>
</tr>
<tr>
<td></td>
<td>Switch to manual mode</td>
</tr>
<tr>
<td></td>
<td>Pusher forward (picture may be reversed)</td>
</tr>
<tr>
<td></td>
<td>Access to the Help screen</td>
</tr>
<tr>
<td>SET</td>
<td>Set up</td>
</tr>
<tr>
<td>ESC</td>
<td>Escape</td>
</tr>
<tr>
<td>PAGE UP</td>
<td>Return to previous menu</td>
</tr>
<tr>
<td>PAGE DOWN</td>
<td>Jump to next menu</td>
</tr>
<tr>
<td></td>
<td>Load a bar stock in the guiding elements</td>
</tr>
</tbody>
</table>

The icons available are the following:

- Current barfeed sequence
- Information screen on current action or mode
- Current torque applied
- Current feeding axis position
- Available functions, depending on the current situation
- Current status or working mode
- Unit system (mm or inch)
- Bar diameter and feedout length
- Clamping device status
- Information line on current action
### 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

### Confirm. In setup mode, the button must be hold for 3 seconds to validate the change.
- Offset correction

### Start sequence
- Increment data in offset correction mode

### Closing guiding elements
- Decrement data in offset correction mode

### Change of the guiding elements
- Opening guiding elements
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 to correspond to the circumstance and availability of the bar feed system.

2.3. Left / right / up / down keys
These keys allow entering values (bar stock diameter, part length, etc.) or parameters.

2.4. Emergency stop button
When a dangerous situation arises, pressing the emergency stop switch interrupts immediately all bar feed system 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. MODE buttons

MENU key
The MENU key allows access to the main menu, where the parameters concerning the production, the interface and the general settings of the barfeed can be reviewed and changed.

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.

The STOP key is not an emergency button, and cannot be interpreted as such. For emergency cases, always use the emergency button located on the top of the remote control.

HELP key
The HELP key displays useful information about the software version, the firmware of the critical components, the current status of the inputs and outputs of the system.
3. SET UP

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

All handling, optional accessories and settings required by the bar feed system to carry out a specific job are part of the set-up.

A few simple operations are necessary to prepare the device to handle another range of diameters.

The set-up must be modified when following parameters change:

- Bar stock diameter
- Bar stock shape
- Part length

3.1. Barfeed mechanical setup

3.1.1. Guiding elements adaptation

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

Depending on the bar stocks to feed, a changeover of the guiding elements (bearings, pusher, collet, front rest adjustment) may be necessary. In this case, please refer to chapter 7, section 2 and 3 of this user manual.

Conditions:  
- No bar stock in the magazine
- Pusher in home position
- Bar feed system in STOP mode.

1. On the remote control, use the manual functions to move back the pusher to its reference, in lifted position.

   1. Press the [STOP] key.

2. Enter the manual menu.

3. Manual mode:

   Select the pusher changeover procedure.
   
   The text "READY TO START PUSHER CHANGEOVER CYCLE" is displayed on the screen.
   
   Start the function.
   
   Le pusher goes to its changeover position. Follow the instructions on the remote control.
2. Once the pusher in changeover position, open the main access cover.

3. Remove the pusher.

4. Guiding elements change:
   
   **Guiding elements**
   - Extract the guiding elements by pulling them out of the aluminium channel.
   - Insert the new elements to the channel, and push down the elements inside the support.
   
   **Front rest**
   - Remove the guiding elements.
   - Install the new guiding elements.

5. Loading finger change:
   
   Replace the loading finger according to the guiding element diameter.

6. Pusher change:
   
   Install the new pusher and place it in the guiding elements.

7. Validate the pusher modification.

1. Enter the manual menu.

2. Change the guiding channels diameter if necessary.

   Once the guiding channel diameter has been changed, press the Start button.

   The pusher is engaged in its home position.

   Once the bar feeder has completed the pusher changeover cycle, the bar feeder is ready to work. At this point, it is necessary to check the parameters like bar stock diameter, guiding elements diameter, feeding length, etc. See this chapter, section 4. SETTINGS for further information.
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 degrees, 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 degrees, 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 degrees 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 degrees.

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

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

3.3. Lathe – barfeed 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 bore 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 (Ø 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 feed system using the retraction device (see Chapter 7, section 6. RETRACTION DEVICE for further information).

Spindle reduction tubes are available from LNS, upon request.
4. SETTINGS

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

4.1. Description

The EXPRESS 332 S2 has several parameters and functions allowing the operator to configure it so that it adapts as closely as possible to the lathe on which it is installed, as well as to the production mode under way.

The position of the flag, or the quantity of material left to be machine, can be known at any time by checking the remote control.

The pushing torque of the motor is automatically selected according to the bar stock diameter.

When hexagonal or squares bars must be loaded, the servo motor intelligently manages the loading into the lathe.

This section indicates the activating and setting procedures for these functions.
4.2. Access to the functions

By pressing the **MENU** key, it is possible to access the setup functions.

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.

Depending on your lathe or your production needs, some of the parameters may not be visible at first. The missing parameters can be unmasked under **SERVICE > DISPLAY**.

### 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
- Overall part length for the auxiliary part (remnant machining)

### Application setup
Allows setting quickly the working mode by selecting the desired application. Following working modes are always available:
- Feed with turret
- Feed without turret
- Dry Run

### Positions setup
Quick access to the following position values:
- End of bar
- Top cut
- Auxiliary end of bar
- Front rest opening position

### Torques setup
Quick access to the following position values:
- Torque for the bar stock loading
- Torque for the part feeding

### Language setup
Allows the access to the other languages

### Miscellaneous functions
- Reference point request
- Front rest setup
- Timings on lathe’s clamping device

### Service setup
Reserved for maintenance to LNS technicians and for unlocking features / displays.
4.2.1. Part setup

Material shape

Round material:
- outer bar diameter

Hex / square material:
- diameter across flats
- diameter across corners
- Front rest guiding element

When the material is profiled, the bar feed system 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.

Guiding elements diameter
The diameter of the guiding elements is always proposed for change after the pusher changeover cycle. Alternatively, it can be changed anytime in the main menu > MISC FUNCTIONS > PAGE DOWN, and enter the new guiding element value.

Total part feed out length

The feed-out length (Lt) includes the part length (Lp), the cut-off tool width (C) and the face-off length (not represented on the picture, depending on the program).
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 feed system to be "informed" of the number of times the clamping device must open for the machining of a part.

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

Loading cycle enable *(may be not visible)*
This parameter defines the moment when the loading cycle must be started.

Top-cut position *(may be not visible)*
During the loading cycle, the bar is automatically loaded into the spindle and automatically positioned in 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.

Optional auxiliary end of bar *(may be not visible)*
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).

Auxiliary end of bar position *(may be not visible)*
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.
4.2.2. 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 (may be not visible):

a) 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.

b) 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 (may be not visible)**
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 (may be not visible)**
This function allows the lathe to run without the bar feeder, ex.: hand loading pieces, etc.
4.2.3. Positions

**Position end of bar signal (may be not visible)**
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.

**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.

**Auxiliary end of bar position (may be not visible)**
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.

**Front rest opening position**
This parameter makes it possible to determine when the front rest will open, in relation to the position of the pusher, in order to permit its passage. The indicated value represents the position of the pusher from its position of origin.

4.2.4. Torques

**Pusher torque rate during part feed out and according to bar stock diameter (%)**
Depending on the diameter of the bar, the bar feed system 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 (%)**
Same principle as for the couple fast forward, applied this time to loading.
4.2.4. 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 feed system (for practical reason, it is not necessary to stop the bar feeder to select a language).

Unit of measure (millimetres / inches)
This parameter defines whether the measures will be indicated in millimetres or in inches.

Request for reference point
This operation allows the bar feed system to find the original position of the servo motor and the parameters when and if these have been lost.

Clamping mode reversed (may be not visible)
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 (may be not visible)
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 (may be not visible)
In the case of a clamping device with jaws, some time may be provided to prevent any movement before the clamping device is completely open.

Front rest settings
This parameter allows calibrating the front rest. It also allows activating or deactivating the front rest. (symbol close then symbol open)
4.2.5. Service

The service parameters allow to configure the bar feed system in its environment and to adapt the interface connected to the lathe. Changing these values can damage the devices and create safety issues. Therefore, these parameters are protected with a password, and only LNS (or certified) technician is authorized to modify them.

1. Barfeed

These parameters set the values of speed, position and torque for a functioning barfeed system.

1. Speed before bar stock measuring (factory value 300 min⁻¹)
2. Speed for bar stock loading (factory value 500 min⁻¹)
3. Pusher feed rate during loading cycle (w/o bar stock) (factory value 3000 min⁻¹)
4. Forward feed rate for part feed out (factory value 800 min⁻¹)
5. Optimum rate during high feed rate (w/o bar stock) in production cycle (factory value 60%)
6. Bar stock insertion torque (factory value 60%)
7. Bar stock extraction torque (factory value 100%)
8. Time for clamping device to close (factory value 0.0 sec)
9. Time for clamping device to open (factory value 0.8 sec)
10. Distance behind the clamping device (factory value 800 mm)
11. Feed out safety tolerance when feeding with help of the turret (factory value 10 mm)
12. Barfeed length (3M/12′/4M/2M)
13. Bar feeder location (left hand / right hand)
14. Enable the automatic pushing stop at end of bar (no/yes)
15. Enable the hydraulic pump when the front rest is open (no/yes)
16. Barfeeder with automatic bar selection (no/yes)
17. Barfeeder equipped with extraction device (no/yes)
18. Barfeeder equipped with front rest (none/pneumatic/automatic)
19. Automatic front rest compensation number of pulses (factory value 1)
20. Automatic front rest calibration compensation number of pulses (factory value 0)

2. Interface

These parameters set the communication and working mode between the lathe and the barfeed.

<table>
<thead>
<tr>
<th>PI00</th>
<th>PI15</th>
<th>PI30</th>
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<tbody>
<tr>
<td>PI02</td>
<td>PI16</td>
<td>PI31</td>
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<td>PI04</td>
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<td>PI13</td>
<td>PI26</td>
<td>PI41</td>
</tr>
<tr>
<td>PI14</td>
<td>PI27</td>
<td>PI42</td>
</tr>
</tbody>
</table>

3. Special functions

1. Barfeeder in: normal operation / simulation mode / demo for show

4. Parameter masking

1. Parameter access: clamping mode (no/yes)
2. Parameter access: end of bar (yes/no)
3. Parameter access: auxiliary end of bar (no/yes)
4. Parameter access: top-out position (no/yes)
5. Parameter access: turret stop parked or moving to position (no/yes)
6. Parameter access: feed out to part length with or without M-code (no/yes)
7. Parameter access: feed out depending on clamping device status (no/yes)
8. Parameter access: machine parts in relation to aux. EOB (no/yes)
9. Parameter access: dry run (no/yes)
10. Parameter access: priority load command from the lathe (A3) (no/yes)
4.2.6. Help screens

From any screen in manual or automatic mode, pressing the HELP button, or on the “?” button on the screen, displays the help screens to troubleshoot or gather information about the software and components.

Current barfeed software, version
This screen displays the current software running the barfeeder and its version.

Interface inputs and outputs
These screens show graphically the active inputs and outputs to ease the troubleshooting process.
5. AUTOMATIC CYCLE

The barfeed autonomy is depending on the bar stocks placed by the operator on the loading ramp. This task can be performed at anytime in the production cycle.

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

- On the loading ramp, standard bar stocks (1200 mm to 3200 mm) must be against the rear limiter. In the case very short bar stocks must be loaded (min. 700 mm), place the bar stocks in the middle of the loading ramp; make sure they will be loaded in the remnant extraction device without falling in the remnant tray.
- 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 magazine is loaded using the cylinder loading into the guiding elements.
2. The pusher is in back position, lifted up and the pusher holding system is open.
3. The loading finger moves forward and pushes the bar stock in measuring position. The bar length is measured.
4. The loading finger goes on to maximal forward position and inserts the bar stock in the spindle.
5. The loading finger moves back to maximal back position.
6. The pusher moves down in working position.
7. The pusher moves forward to the bar stock and finishes the positioning in clamping position (top-cut).
8. The lathe’s clamping device closes.

5.2. Part feed out

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

To each clamping device opening, the pushes 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 remnant switch (SQ12).
11. The extraction system clamps the material and the pusher goes in home position.
12. Once the pusher in home position, the extraction system opens and the remnant falls in the tray.
13. The pusher moves up.

6. POWERING OFF

Before handling the bar feeder, stop the lathe at the end of part cycle!

When powering off the barfeed, make sure the pusher is in reference position, lifted up and no bar stock is present in the guiding element.

To power down, turn the switch to the left, to the 0off position.
CHAPTER 9

MALFUNCTIONS
1. FACTORS AFFECTING PERFORMANCE

1.1. Installation

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

**Distance**

The distance between the bar feed system and the lathe influences greatly the quality of the guiding. The further the bar feed system 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 feed system is done in accordance with the instructions indicated in Chapter 3. Setting into operation.

**Alignment**

The guiding channel of the bar feed system 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 feed system is done in accordance with the instructions indicated in Chapter 3. Setting into operation.

**Spindle length**

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

1.2. 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.

1.3. Gap between the spindle and the bar

While the rear of the bar is maintained by front rest of the bar feed system 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 chapter 8. OPERATION, section 3.3. Lathe – barfeed adaptation.
1.4. Material

Bars
To obtain a perfect insertion inside the collet of the bar feed system, 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.

In some cases, when the diameter of the bar is close to the external diameter of the collet (see Assembly of pushers), the rear of the bars must be machined to the inside diameter (D) of the collet. The length of the machining (L) must be at least 30mm.

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.

Profiled material
It is recommended to install a bushing, inside the clamping device, with the same inside profile (+ 0.2 mm) as the bar. The rear of this collet and the front of the bars should be flat. During the loading cycle, a slight rotation of the spindle (about 30 RPM) is desirable.

Bars 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.

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. Aluminium bars of aluminium are very easy to guide.
2. MAINTENANCE

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

2.1. Hydraulics

It is important to clean the bars (even briefly) before loading them on the feed system magazine. Excessive dirt can form a deposit at the base of the bar feed system, which can in turn slow the oil return.

2.2. Pneumatics

The air-filtering device is equipped with an automatic drainage valve, making it unnecessary to empty it. The water recuperated comes from the pneumatic circuit of the building. It is advisable to make certain that the air received by the bar feed system is as dry as possible (see Chapter 5 / Pneumatics).

2.3. Batteries

In the event of a power failure, a backup battery saves the data contained in the PLC. It is possible that with time this battery will slowly drain; in this case a message will be displayed on the remote control. The battery must be replaced as soon as possible with a battery of the same type. The same applies to the SERVO amplifier.

2.4. Mechanics

Rotating sleeves

In order to guarantee the correct operation of the bar feed system, the rotating sleeve must function perfectly. Although the construction of the sleeve is very sturdy and reliable, it is recommended to verify periodically that it rotates without friction. If a defect should be present, please contact your local agent.

Chain drive

It is possible that after a certain amount of use, the drive needs to be tightened. To tighten the drive, refer to Chapter 7, section 3. CHAIN DRIVE.

2.5. Cleaning

As with any vehicle, machinery, or device, regular cleaning of your bar feed system can only serve to improve its operation and prolong its useful life.

For cleaning on the outside, use a soft cloth and a regular detergent; for the inside, use a cloth or a brush soaked of petrol. However, make sure that the rollers and parts made of synthetic materials do not come into contact with these products.

The use of compressed air for cleaning is not advisable, because particles could become lodged in sensitive areas and impede the proper operation of the bar feed system.

At no time should solvents, such as acetone, or diluents be used for cleaning the bar feed system. At no time should cleaning products come into contact with electrical components.
CHAPTER 10

APPENDICES
APPENDIX A: 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) >

> SUB-PROGRAM
N... CLOSE COLLET
N... TURRET HOME
N... "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)

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)

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

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Expected delivery:

Location and date:

Signature and stamp of the company:
### APPENDIX C: ADRESSES LNS

#### LNS AGENCIES

##### SCHWEIZ / SUISSE
- **LNS S.A.**
  - Headquarter
  - Case postale 33
  - CH – 2534 ORVIN
- **TEL.** +41 / 32 358 02 00
- **FAX** +41 / 32 358 02 01

##### FRANCE
- **LNS France**
  - Pae les Jourdies
  - BP 355
  - St-Pierre en Faucigny
- **TEL.** +33 4 50 03 93 32
- **FAX** +33 4 50 03 93 34

##### GREAT BRITAIN
- **LNS TURBO UK Limited**
  - Waterside Park, Valley Way
  - Wombwell
  - GB – Barnsley S73 0BB
- **TEL.** +44 1226 27 00 33
- **FAX** +44 1226 27 00 44

##### ITALIA
- **LNS AUTOMAZIONE S.R.L.**
  - Via Mons. Colombo 34
  - IT – 21053 CASTELLANZA – VA
- **TEL.** +39 0 331 501 901
- **FAX** +39 0 331 482 101

##### USA / CANADA / MEXICO
- **LNS AMERICA INC**
  - 4621 East Tech Drive
  - CINCINNATI, OHIO 45245
  - USA
- **TEL.** +1 513 528 56 74
- **FAX** +1 513 528 57 33

#### LNS AGENTS

- 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)