Alpha ST320 S2
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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 right-hand corner of the page.
- The chapter number and title are indicated in the top left-hand 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

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The names of the products indicated in this manual are registered trademarks.
3. 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.

- 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.
4. SAFETY DEVICES

4.1. Description

The ALPHA ST320 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 and the HMI, the functions of the bar feed system and the lathe are immediately stopped.

![Warning symbol]

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.

4.2. 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>C</td>
<td>Front tube / telescopic tube</td>
</tr>
<tr>
<td>SQ8</td>
<td>Safety switch of the main access cover</td>
</tr>
</tbody>
</table>
1. CHARACTERISTICS (*)

<table>
<thead>
<tr>
<th></th>
<th>3 meters</th>
<th>12 '</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>400 kg</td>
<td>470 kg</td>
</tr>
<tr>
<td>Dimensions</td>
<td>see p. 2-4</td>
<td></td>
</tr>
<tr>
<td>Minimum – Maximum diameter</td>
<td>3 mm – 20 mm</td>
<td></td>
</tr>
<tr>
<td>Maximum bar stock length</td>
<td>3200 mm</td>
<td>3800 mm</td>
</tr>
<tr>
<td>Minimum – Maximum remnant length</td>
<td>80 mm – 400 mm</td>
<td></td>
</tr>
<tr>
<td>Magazine capacity</td>
<td>54 pcs (5mm) / 13 pcs (20mm)</td>
<td></td>
</tr>
<tr>
<td>Pneumatical pressure</td>
<td>5 bar</td>
<td></td>
</tr>
<tr>
<td>Air consumption</td>
<td>&lt; 10 l / loading cycle</td>
<td></td>
</tr>
<tr>
<td>Main electrical power (Volt) *</td>
<td>3x 200 – 380V 50 Hz – 60 Hz</td>
<td></td>
</tr>
<tr>
<td>Maximum feed rate</td>
<td>&gt;100 m/min</td>
<td></td>
</tr>
<tr>
<td>Loading cycle</td>
<td>30 – 40 sec.</td>
<td></td>
</tr>
<tr>
<td>Hydraulic oil</td>
<td>ISO 100/40 litres</td>
<td></td>
</tr>
</tbody>
</table>

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

2. CAPACITY

<table>
<thead>
<tr>
<th>Channel size</th>
<th>Pusher size</th>
<th>Bar size</th>
<th>Minimum available spindle size</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>7</td>
<td>3 - 5</td>
<td>8</td>
</tr>
<tr>
<td>11</td>
<td>10</td>
<td>3 - 10</td>
<td>11</td>
</tr>
<tr>
<td>14</td>
<td>13</td>
<td>5 - 12</td>
<td>14</td>
</tr>
<tr>
<td>17</td>
<td>16</td>
<td>6 - 16</td>
<td>17</td>
</tr>
<tr>
<td>19</td>
<td>18</td>
<td>6 - 18</td>
<td>19</td>
</tr>
<tr>
<td>21</td>
<td>20</td>
<td>6 - 20</td>
<td>21</td>
</tr>
<tr>
<td>23</td>
<td>22</td>
<td>6 - 22</td>
<td>23</td>
</tr>
</tbody>
</table>

The ALPHA ST320 S2 is able to load bar stock diameter from 3 up to 20 mm (22mm with bar stock preparation). For best performance, LNS strongly recommends to choose the channel diameter with a minimum space between the bar stock and the channel. The bigger this space is, the more vibration will occur.

3. FLOOR PLAN

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.
4. 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>Vice</td>
</tr>
<tr>
<td>D</td>
<td>Remnant control</td>
</tr>
<tr>
<td>E</td>
<td>Guiding channel</td>
</tr>
<tr>
<td>F</td>
<td>Remnant 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>Air blast (not visible)</td>
</tr>
<tr>
<td>K</td>
<td>Bar length measuring device (positioning switch)</td>
</tr>
<tr>
<td>L</td>
<td>Front stand</td>
</tr>
<tr>
<td>M</td>
<td>Rear stand</td>
</tr>
<tr>
<td>N</td>
<td>Loading finger</td>
</tr>
<tr>
<td>P</td>
<td>Air preparation unit (not visible)</td>
</tr>
<tr>
<td>R</td>
<td>Electrical cabinet</td>
</tr>
<tr>
<td>S</td>
<td>Pneumatic assembly</td>
</tr>
<tr>
<td>T</td>
<td>Channel operation device (not visible)</td>
</tr>
<tr>
<td>U</td>
<td>Front tube (for fixed head lathe) or telescope</td>
</tr>
<tr>
<td>V</td>
<td>Hydraulic pump</td>
</tr>
<tr>
<td>W</td>
<td>Hydraulic oil tank</td>
</tr>
</tbody>
</table>
CHAPTER 3

SETTING INTO OPERATION
1. TRANSPORTATION

1.1. Description

The Alpha ST320 S2 bar feed system may be delivered either on a pallet or packed in a wooden crate according to the customer requirement. The uncrating and lifting instructions recommended by LNS must be observed in order to prevent any injuries to persons and damaged to objects.

1.2. Unpacking

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

- If the bar feed system is received in a crate, start by unscrewing the top panel.
- Remove the front.
- Remove the side-walls.

- A pusher and guiding channel set is mounted in the bar feed system (A). Depending on the purchase order, other sets may be delivered in a separate box.
- The interface plug/cable is tightened with remote control cable. Interface diagram is placed inside the electrical cabinet. Documentation, tools, finger chucks, lathe connecting parts, front tube/telescopic tube, air tube... are packed inside the accessories box.
1.3. Preparation of mounting

For installing the bar feed system, it’s advisable to contact LNS or one of its branches, agents. The latter cannot be held responsible for any malfunction resulting from an incorrect installation in which they did not take part.

Procedures of preparation:

- Insert two bars into the holes of the stands, place the hoist vertically above the bar feed system.
- Place the straps over the ends of the bars, and then attach them to the hoist. Raise the hoist to tighten the straps.

Notice:

- The loading capacity of both the hoist and straps must be larger than 1 ton.
- Remove the screws for holding the bar feed system to the pallet during transportation.
- Lift the bar feed system and removes the pallet. Ensure that the bar feed system is balanced.
- Mount the Stands.
- Place the bar feed system behind the lathe and proceeds mounting procedures instructed on the next chapter.
2. MOUNTING

2.1. Positioning of the bar feeder

The bar feeder should be positioned behind the lathe according to three major parameters. The parameters must be satisfied by sequence.

A. Bar stock length check:

A.1. Bar feed system connected to fixed type lathe:

When the bar feed system finished FIRST FEED, the bar stock front tip should keep 10mm gap from the rear end of the chuck.

A.2. Bar feed system connected to Swiss type lathe:

When the bar feed system finished FIRST FEED while the spindle is currently at maximum forward position, the bar stock front tip should keep 10mm gap from the rear end of the chuck.
B. Pusher length check:

B.1. Bar feeder system connected to fixed type lathe:

To get the shortest remnant, the pusher tip should be able to contact the rear end of the chuck.

B.2. Bar feeder system connected to Swiss type lathe:

To get the shortest remnant, the pusher tip should be able to contact the rear end of the chuck when the spindle is currently at maximum forward position.
C. Front tube / Telescope length check:

C.1. Bar feeder system connected to fixed type lathe:

The front tube should be able to cover the space between the bar feed system and the spindle.

C.2. Bar feeder system connected to Swiss type lathe:

When the spindle is at maximum forward, distance L1 should be 10mm **SMALLER** than the telescope’s maximum extended length.

When the spindle is at maximum backward, distance L2 should be 10mm **LARGER** than the telescope’s minimum retracted length.
3. ALIGNMENT AND ANCHORING

- 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.

- Place a level on the stand. Adjust stem (B) so that the bar feed system are levelled on the lateral direction.

- Make sure the bar feed system is well supported by the nut (C) on central stem.

- On each stand, loose 8 pieces of nut (D), set height of the bar feed system by adjusting nut (C). Together with the vertical alignment, proceed with the lateral alignment.

- When the alignment is accomplished, tighten all 8 nuts (D) on each stand.

- 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 (E) have been provided. 8 anchorage bolts (F) 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 all the lock nuts (A).

**Notice:**
Before the bar feed system is anchored on the ground and the alignment is confirmed perfectly, the lock nuts (A) should not be tightened.
Once the bar feed system has been aligned and anchored to the ground, the bar feed system must be connected to the interface of the lathe and compressed air need 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 see 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

The electrical parts of the bar feed system, as well as the diagrams representing them, conform to the ISO/IEC 204-1, 617 international electrical codes.

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. When a group of elements is indicated, look for the element and then write down the ordering number of the desired element.
1.2. Overview

<table>
<thead>
<tr>
<th>Designation</th>
<th>Article No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-</td>
<td>Remote control</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>Electrical cabinet</td>
</tr>
<tr>
<td>HMI</td>
<td>-</td>
<td>Human Machine Interface (display)</td>
</tr>
<tr>
<td>M1</td>
<td>-</td>
<td>Servo motor</td>
</tr>
<tr>
<td>M2</td>
<td>-</td>
<td>Hydraulic pump</td>
</tr>
<tr>
<td>QS1</td>
<td>-</td>
<td>Main switch</td>
</tr>
<tr>
<td>SQ0</td>
<td>-</td>
<td>Hydraulic pressure sensor</td>
</tr>
<tr>
<td>SQ1</td>
<td>-</td>
<td>Bar length measuring device</td>
</tr>
<tr>
<td>SQ2</td>
<td>-</td>
<td>Pusher in home position sensor</td>
</tr>
<tr>
<td>SQ3</td>
<td>-</td>
<td>Guide channel in closed position sensor</td>
</tr>
<tr>
<td>SQ4</td>
<td>-</td>
<td>Clamping device sensor</td>
</tr>
<tr>
<td>SQ5</td>
<td>-</td>
<td>Guide channel in open position sensor</td>
</tr>
<tr>
<td>SQ8</td>
<td>-</td>
<td>Main access cover closed sensor</td>
</tr>
<tr>
<td>STP1</td>
<td>-</td>
<td>Emergency stop button</td>
</tr>
</tbody>
</table>
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>PCB</td>
<td>-</td>
<td>Printed Circuit Board (PCB)</td>
</tr>
<tr>
<td>PLC</td>
<td>-</td>
<td>Programmable Logic Controller (PLC)</td>
</tr>
<tr>
<td>RB, RA</td>
<td>-</td>
<td>RB, RA — Screw loading relay (Alpha ST212 S2 only)</td>
</tr>
</tbody>
</table>
| K8, K9, K10, KS | - | K8 and KS: CE relay  
              |              | K8, KS, K9 and K10: double CE relay |
| K1          | -           | Electromagnetic switch |
| KM1         | -           | Hydraulic pump (M2) contactor |
| QF2         | -           | 24V DC power supply breaker |
| QM1         | -           | Hydraulic pump (M2) breaker |
| A           | -           | Servo amplifier |
| B           | -           | 24V DC power supply |
| C           | -           | Analogue module |
2.2. Power supply

The main power is supplied by the interface cable. Before connecting the interface cable to the lathe, make sure the power supply meets the interface specifications.

The power supplied to the bar feeder is protected by a breaker (6A max).

2.2.1. Main power switch QS1

ON / OFF switch for the main power.

⚠️ Make sure it is turned OFF before opening the electrical cabinet.
2.2.2. Transformer

If the power supplied by the interface cable does not meet the required 220V AC the transformer must be used.

The incoming power must be connected to the Primary Terminal Block. Use the contacts corresponding to the supplied power (346V AC to 440V AC, see drawing below).

The outgoing power is always connected to the 220VAC terminals of the Secondary Terminal Block.
### 2.3. Diagrams

#### 2.3.1. Symbols

<table>
<thead>
<tr>
<th>Index</th>
<th>Symbol</th>
<th>Description</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image" alt="Main circuit breaker" /></td>
<td>Main circuit breaker</td>
<td>QM1</td>
</tr>
<tr>
<td>2</td>
<td><img src="image" alt="Circuit breaker" /></td>
<td>Circuit breaker</td>
<td>QF2</td>
</tr>
<tr>
<td>3</td>
<td><img src="image" alt="Diode" /></td>
<td>Diode</td>
<td>--</td>
</tr>
<tr>
<td>4</td>
<td><img src="image" alt="Main disconnect switch" /></td>
<td>Main disconnect switch</td>
<td>QS1</td>
</tr>
<tr>
<td>5</td>
<td><img src="image" alt="Emergency stop button" /></td>
<td>Emergency stop button</td>
<td>STP1</td>
</tr>
<tr>
<td>7</td>
<td><img src="image" alt="Hydraulic pump" /></td>
<td>Hydraulic pump</td>
<td>M2</td>
</tr>
<tr>
<td>8</td>
<td><img src="image" alt="Light Emitting Diode" /></td>
<td>Light Emitting Diode</td>
<td>--</td>
</tr>
<tr>
<td>9</td>
<td><img src="image" alt="Magnetic connector" /></td>
<td>Magnetic connector</td>
<td>KM1 / K1</td>
</tr>
<tr>
<td>10</td>
<td><img src="image" alt="Pressure switch" /></td>
<td>Pressure switch</td>
<td>SP1 / SQ0</td>
</tr>
<tr>
<td>11</td>
<td><img src="image" alt="Proximity switch" /></td>
<td>Proximity switch</td>
<td>SQ1 / SQ2 / SQ3 SQ4 / SQ5</td>
</tr>
<tr>
<td>12</td>
<td><img src="image" alt="Relay" /></td>
<td>Relay</td>
<td>R1 ~ R5</td>
</tr>
<tr>
<td>13</td>
<td><img src="image" alt="Remote control buttons" /></td>
<td>Remote control buttons</td>
<td>S1 ~ S7</td>
</tr>
<tr>
<td>14</td>
<td><img src="image" alt="Servo motor" /></td>
<td>Servo motor</td>
<td>M1</td>
</tr>
<tr>
<td>15</td>
<td><img src="image" alt="Solenoid valve" /></td>
<td>Solenoid valve</td>
<td>YV0 / YV1 YV2A / YV2B YV3 / YV4 / YV5</td>
</tr>
</tbody>
</table>
2.3.2. AC circuit
2.3.3. Emergency stop loop
CHAPTER 4: ELECTRICS

3. ELECTRICAL COMPONENTS

3.1. Servo drive power loop

The servo drive is powered by 3 phases 220V AC through K1 contactor.

3.1.1 K1 contactor

K1 contactor is energized by the emergency stop loop. When the emergency stop loop is open, the contactor K1 will be de-energized and interrupt the power supply to the servo drive.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Power poles input</td>
</tr>
<tr>
<td>B</td>
<td>Auxiliary contacts</td>
</tr>
<tr>
<td>C</td>
<td>Auxiliary contacts (double CE version)</td>
</tr>
<tr>
<td>D</td>
<td>Status indicator</td>
</tr>
<tr>
<td>E</td>
<td>Power poles output</td>
</tr>
</tbody>
</table>

3.1.2. Servo amplifier

The Servo Amplifier controls the movement of the Servo Motor.

NOTE: Never change the parameter settings of the Servo Amplifier. They are factory pre-set.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>I/O connector</td>
</tr>
<tr>
<td>B</td>
<td>Encoder connector</td>
</tr>
<tr>
<td>C</td>
<td>Serial connector</td>
</tr>
<tr>
<td>D</td>
<td>2 phases 220 V input for controller</td>
</tr>
<tr>
<td>E</td>
<td>3 phases 220 V input</td>
</tr>
<tr>
<td>F</td>
<td>3 phases 220 V output for motor</td>
</tr>
<tr>
<td>G</td>
<td>Protective earth</td>
</tr>
<tr>
<td>H</td>
<td>Display</td>
</tr>
</tbody>
</table>
3.2. Hydraulic pump power loop

The hydraulic pump M2 is powered by 3 phases 220V AC through KM1 contactor and protected by QM1 breaker.

3.2.1. Circuit breaker - QM1

QM1 interrupts the 3 phases which power the hydraulic motor as well as emergency stop circuit. If the motor requires excessive power (the breaking current is set to 2.5 amperes). The circuit breaker activates and button E trips. Both power supply to hydraulic pump and the emergency stop loop are interrupted.

After the problem is fixed, reset the circuit breaker by pressing button E.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Power poles input</td>
</tr>
<tr>
<td>B</td>
<td>Auxiliary contacts</td>
</tr>
<tr>
<td>C</td>
<td>Rating adjustment (preset at 2.5A)</td>
</tr>
<tr>
<td>D</td>
<td>Stop button</td>
</tr>
<tr>
<td>E</td>
<td>Start button</td>
</tr>
<tr>
<td>F</td>
<td>Power poles output (connected to K1)</td>
</tr>
</tbody>
</table>

3.2.2. KM1

The KM1 contactor is energized by 24V DC from PLC output Y14. When this signal is OFF, the KM1 is de-energized and the power to hydraulic pump is cut off.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Power poles input (from QM1)</td>
</tr>
<tr>
<td>B</td>
<td>Control circuit</td>
</tr>
<tr>
<td>C</td>
<td>Status indicator</td>
</tr>
<tr>
<td>D</td>
<td>Power poles output (to M2)</td>
</tr>
</tbody>
</table>
3.2.3. QF2 breaker

Breaker QF2 protects the two phases which power both PLC and 24V DC power supply. If the 2 phases required power exceeds 4A, the breaker activates and lever B flips down. The power supply to PLC and 24V DC power supply is immediately interrupted.

After the problem is fixed, reset the breaker by flipping lever B up.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Power poles input</td>
</tr>
<tr>
<td>B</td>
<td>ON / OFF lever</td>
</tr>
<tr>
<td>C</td>
<td>Power poles output</td>
</tr>
</tbody>
</table>
### 3.2.4. PLC (Programmable Logic Controller)

#### a) Primary module

The PLC processes the signals from the interface, sensors and remote control and sets the outputs according to the program logic.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Input contacts. All connected wires are labelled</td>
</tr>
<tr>
<td>B</td>
<td>Input contacts notation</td>
</tr>
<tr>
<td>C</td>
<td>Input signals indication LED. Indicates the status of inputs X0 to X43</td>
</tr>
<tr>
<td>D</td>
<td>PLC status indication LED</td>
</tr>
<tr>
<td>E</td>
<td>Communication port</td>
</tr>
<tr>
<td>F</td>
<td>Output signals indication LED. Indicate the status of outputs Y0 to Y27</td>
</tr>
<tr>
<td>G</td>
<td>Output contacts notation</td>
</tr>
<tr>
<td>H</td>
<td>Output contacts</td>
</tr>
</tbody>
</table>
b) Analogue module

The analogue signals are used to control the torque and speed of the servo motor.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Torque control output contacts</td>
</tr>
<tr>
<td>B</td>
<td>Speed control output contacts</td>
</tr>
<tr>
<td>C</td>
<td>Power indication LED</td>
</tr>
</tbody>
</table>
c) I/O diagram
3.2.5. 24V DC power supply

The power supply converts AC 220 V to 24V DC for the low voltage circuit.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>220V AC input terminals</td>
</tr>
<tr>
<td>B</td>
<td>24V DC output terminals</td>
</tr>
</tbody>
</table>

3.2.6. PCB (Printed Circuit Board)

PCB is a board with circuit printed and electrical components welded on the surface. It offers sockets and terminals for electrical components like relays, cables and fuses. Refer to the table below for functions of each terminal.
4. INTERFACE

4.1. Description

Interface presents all the signals exchanged between the bar feed system and the lathe. The interface cable(s) which serves to transmit the interface signals is/are provided by LNS.

There is a wide range of different interfaces available to meet the requirement of each lathe. A diagram of the installed interface can be found in the electrical cabinet. Before connecting the bar feeder, make sure the installed interface is suitable for your lathe. If in doubt – contact LNS.

A correct connection between lathe and bar feeder is critical for safe and reliable operation. It is recommended to request a trained technician to install the bar feeder.
4.2. Interface diagram example
4.3. Signals from the lathe to the bar feed system

The interface logic can be configured with service parameters. Only trained personnel should change these settings.

a) 24V DC power supply

All the signals from the lathe are powered by the 24V DC from the bar feed system. When the corresponding relay is energized at the lathe, the 24V DC travels through the corresponding contact and returns to the PLC. The PLC hence receives lathe signals.

b) Emergency stop signals from the lathe

This contacts XT8 and XT9 are part of the emergency stop loop of the bar feed system. When the emergency circuit is open between XT8 and XT9, the bar feed system goes to EMERGENCY STOP MODE and arise an e01 alarm and energize relay R1.

c) Lathe chuck signal / Lathe clamp signal (PLC input X11)

Chuck signal is for confirming the status of lathe chuck (collet, clamping device). This signal starts feeding and bar change process of bar feed system by itself as well as combination with other signals.

The signal logic will be handled according to MODE 2 setup.

d) Lathe in automatic mode (PLC input X12)

This signal indicates that the lathe is in automatic mode. The lathe is executing the machining program cyclically.

The signal logic will be handled according to MODE 3 setup.

e) BACK START / Load command (PLC input X13)

Generally the bar change process will be automatically started with chuck signal when the BAR END signal is ON. Exceptions:

- The part requires multiple feeds.
- The lathe is equipped with a sub-spindle
- The lathe is of twin spindle type

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 process of a new bar. This signal will be used as a BACK START / LOAD COMMAND from the lathe. Refer to MODE 7 and 19 for related set up.

The signal logic will be handled according to MODE 4 setup.

f) TORQUE STOP (PLC input X14)

When the bar feed system is in automatic mode. The pusher pushes forward all the time except it's currently returning for bar loading. Under certain circumstances, this behaviour might damage either tool or sub-spindle when the chuck is open without stopper in front. Whenever this signal is present, the pusher stops its movement immediately as long as the torque stop signal is ON.

Generally this signal will be ON before chuck open when the end of bar is reached. (The signal logic will be handled according to MODE 5 setup.) After the last part is machined, the stopper is usually not present anymore. The bar feed system must not push the bar when the chuck is open. To avoid this, the TORQUE STOP signal must be ON.
4.4. Signals from the bar feed system to the lathe

a) 24V DC power supply

All the signals from the bar feed system were powered by the 24V DC from the lathe. When the corresponding relay energized at the bar feed system, the 24V DC travel through corresponding contact at bar feed system relay and return to lathe PLC. The lathe PLC hence receives bar feed system signals.

b) R1 alarm relay

When the bar feed system is in normal operation, the R1 relay is energized and the signal to the lathe is ON. In the event of an alarm or break in the emergency stop loop, this relay is de-energized and the signal to the lathe is OFF.

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

c) R2 START signal relay

Relay R2 confirms the action of general part feed out or/and a new bar stock loading is finished. Refer to service parameter MODE 15 and 16 for related set up.

d) R3 BAR END (end of bar) relay

When the pusher reaches BAR END position during feed out process, relay R3 energizes. This signal is used to indicate that the rest bar stock length is not long enough to machine a complete part according to part length set at P02.

In case the part needs multiple chuck openings. This position must set according to the longest length of those different machining sections.

Refer to operation parameter P02, P04 and service parameter MODE 14 for further information.

e) R4 bar feed system in auto relay

This signal is present as soon as the bar feed system is switched into automatic mode (AUTO READY + AUTO START)

f) R5 INCHING relay

This relay energizes under circumstances below presents during bar change process:

- the short pusher is moving forward for placing the bar stock at FIRST FEED position
- the pusher is moving forward for placing the bar stock at TOP CUT position after insertion

For bar stocks without proper preparation or is profiled, it might struggle to enter the chuck. Generally the spindle slowly rotates when the new bar stock is passing through. For lathes that the spindle is not allowed to rotate when chuck is open, this signal acts as an external order to turn the spindle.

Refer to service parameter MODE 25 for more information.
4.5. Options

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

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

a) Synchronization device signal (contact 127 at terminal block 23)

When this signal is ON and bar feed system is in automatic mode. The pusher movement will be synchronized with the synchronization device. If the synchronization device is connected with the headstock, the pusher movement will be synchronized with the moving headstock. Therefore this function only applied to Swiss type lathe. Its function is equal to service parameter MODE 13 = 1. The function is present when and only when this signal is ON. To apply this function, there must be a signal sent continuously from the lathe once the lathe is in automatic mode and chuck is closed. To avoid unexpected damage, this signal must be OFF when chuck is open.

b) Lathe door is in open position (contact 130 at terminal block 23)

When this signal is ON, the effect is equal to pressing the manual button on the remote control. When the lathe is in open position, the bar feed system pusher will be moving slowly when the operator push forward or backward button.

This signal is only available when the bar feed system is in manual mode. When the bar feed system is in automatic mode. Opening the lathe door will not switch the bar feed system to manual mode.

4.6. 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 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. GENERAL DESCRIPTION

1.1. Description

The following automatic movements of the ALPHA ST320 S2 bar feed system are done via pneumatic elements, namely:

- Loading finger
- Channel opening/closing pneumatic cylinder
- Material clamping device
- Bar length measuring device
- Front rest
- Air blast

To guarantee an optimal operation of the bar feed system, a pressure of 5 bar (75psi) 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>-</td>
<td>Bar loading pneumatic cylinder</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>Solenoid valve manifold</td>
</tr>
<tr>
<td>C</td>
<td>-</td>
<td>F.R.L. combination unit (not visible)</td>
</tr>
<tr>
<td>D</td>
<td>-</td>
<td>Material clamping device</td>
</tr>
<tr>
<td>E</td>
<td>-</td>
<td>Front rest</td>
</tr>
<tr>
<td>F</td>
<td>-</td>
<td>Air blast ring (not visible)</td>
</tr>
<tr>
<td>SP1</td>
<td>-</td>
<td>Air pressure switch (not visible)</td>
</tr>
</tbody>
</table>
2. F.R.L. COMBINATION UNIT

2.1. Description

The F.R.L. (Filtering-Regulation-Lubrication) combination serves to perform filtering, lubrication and regulation of the pressure air before it enters pneumatic system.

The air must be furnished at a pressure of 5 bar and whenever possible, clean and dry.

2.2. Layout of the elements

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Air inlet</td>
</tr>
<tr>
<td>B Pressure regulator</td>
</tr>
<tr>
<td>C Pressure gauge</td>
</tr>
<tr>
<td>D Condensate collector</td>
</tr>
<tr>
<td>E Lubricator</td>
</tr>
<tr>
<td>F Oil cup</td>
</tr>
<tr>
<td>G Regulated air outlet with 8mm / G1/4 push-in fitting</td>
</tr>
<tr>
<td>H Oil refilling plug</td>
</tr>
</tbody>
</table>
2.3. Connection

For the pneumatic connections of the bar feed system, LNS SA provides a tube with quick acting coupler and probe pre-mounted.

Before connection, confirm the factory air pressure is not larger then 8 bar / 14 psi. Connect this tube on both F.R.L. unit and factory compressed air source.

2.4. Settings

1. Unlocking the adjusting knob by pulling it upward.

2. To increase the pressure, turn the knob clockwise. To decrease the pressure, turn it counter clockwise.

   The operational pressure should be kept at 5 bar.

3. When the setting is finished, lock the knob by pressing it downward.
3. SOLENOID VALVE MANIFOLD

3.1. Description
The solenoid valve manifold allows the control and pressure monitoring of air actuated elements of the bar feed system.

3.2. 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>C13110500</td>
<td>Ø8mm air inlet (from F.R.L. combination)</td>
</tr>
<tr>
<td>B</td>
<td>C14120200</td>
<td>Air outlet / silencers</td>
</tr>
<tr>
<td>SP1</td>
<td>C11120400</td>
<td>Pressure switch (PE converter)</td>
</tr>
<tr>
<td>YV4</td>
<td>C1110100</td>
<td>Spindle attached anti-vibration (optional)</td>
</tr>
<tr>
<td>YV5</td>
<td>C13110401</td>
<td>Air blast</td>
</tr>
<tr>
<td>YV3</td>
<td>C1110100</td>
<td>Material clamping device</td>
</tr>
<tr>
<td>YV1</td>
<td>C1110100</td>
<td>Front rest</td>
</tr>
<tr>
<td>YV0</td>
<td>C1110100</td>
<td>Material loading</td>
</tr>
<tr>
<td>YV2A / YV2B</td>
<td>C1110200</td>
<td>Channel opening / closing</td>
</tr>
</tbody>
</table>
3.3. Solenoid valve

Directly controlled by the PLC, the solenoid valves activate the cylinders.

By pressing the button A, the cylinders could be activated manually. This button could be kept at the activation position by pressing it down and turning 90° clockwise. This position could be released by turning it 90° counter clockwise.

This manoeuvre may prove to be useful during tests or maintenance. When the button is released, the pneumatic cylinder returns to its resting position (except for pneumatic cylinders activated by double-effect solenoid valve YV2).

3.4. Air pressure switch SP1

To guarantee the compressed air is supplied to the bar feed system, the pressure switch serves to confirm the pressure is existing.

The pressure switch engages when the pressure is larger than 2 bar and closes the emergency stop circuit.

When the air pressure drops below 0.5 bar, the switch disengages and interrupts the emergency stop circuit. An alarm e01 arises.
4. MAINTENANCE

The pneumatic system should be regularly maintained in order to ensure the system is powered by qualified compressed air. We recommend the user to check the F.R.L. combination as instructed below every week.

1. Check the condensate collector:

   The condensate collector is a measure of quality of the compressed air. A qualified air should not produce any condensate inside the collector.

   The collector has an automatic drain plug. When there is no pressure inside the F.R.L. system, the drain plug is activated by the spring and the condensate released.

   For users which always connect the compressed air, a manual draining is needed. Whenever the condensate is found inside the collector, drain the condensate by pushing the plug upward and check the humidity control system.

2. Check lubricator:

   The oil consumption varies with the bar feed system application of the user. The oil height should not exceed half height of the cup. When the oil is not enough, follow the procedures below to refill it. It is recommended to use oil ISO VG 32 only.

   - Disconnect the air inlet tube.
   - Remove the plug and fill the oil up to the position shown on the figure.
   - For the best performance, the oil should drop every cylinder operation. Adjust the fluent with auxiliary of channel open button. Let the oil drop once after pressing the “channel open” button for 10 times.
   - Connect the air inlet tube and turn air source on.
1. GENERAL DESCRIPTION

The guiding concept of the ALPHA ST320 S2 feed system consists mainly in maintaining the bar suspended in an oil bath.

The hydraulic pump injects the oil into the space between running bar stock and guiding channel elements hence achieve functions below:

1. To keep the bar stock positioned at central of the channel.
2. To reduce friction between running bar stock and the guiding channel.
3. To absorb the vibration created during machining.

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

1.1. 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>-</td>
<td>Remnant tray</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>Guiding channels</td>
</tr>
<tr>
<td>C</td>
<td>-</td>
<td>Oil tank</td>
</tr>
<tr>
<td>D</td>
<td>-</td>
<td>Level</td>
</tr>
<tr>
<td>E</td>
<td>-</td>
<td>Drain plug (underneath the oil tank)</td>
</tr>
<tr>
<td>M2</td>
<td>-</td>
<td>Hydraulic pump motor</td>
</tr>
<tr>
<td>SQ0</td>
<td>-</td>
<td>Hydraulic pressure sensor</td>
</tr>
</tbody>
</table>

* Check chapter 7 for article number detail
2. DESCRIPTION OF THE ELEMENTS

2.1. Hydraulic pump motor M2
The hydraulic pump is powered by 3 phases 220V AC. The hydraulic pump powers on immediately when conditions below satisfied:

- The bar feed system switched to automatic mode.
- The guide channel is closed.
- The pusher position is located between home position the “2nd” of parameter P06.

The hydraulic oil is injected into the guiding channels and filling the space between the rotating bar stock and guiding channel. Once the pusher exceeds “2nd” position of parameter P06 or the bar feed system switched to manual mode. The hydraulic pump powers off.

2.2. Remnant tray
The tray gathers remnants removed by the material clamping device. It is located between the bar feeder body and oil tank. The maximum available remnant length is 300mm.

The available capacity of the tray depends on remnant diameter and length. The tray should be checked and emptied regularly to make sure the tray is not overfilled. An overfilled remnant tray might cause problems below:

1. The recycled oil might be interrupted and spill out.
2. The remnants might be lying between the material clamping space and interrupt the next bar stock insertion.
3. The tray might be too heavy to be moved.

It is recommended to keep the height of the remnant hip under the opening.
2.3. Pressure switch SQ0
To ensure the hydraulic system performance, the pressure is continuously monitored by a pressure switch set at the factory at 0.5 bar. Whenever the hydraulic pressure is lower than this value, an alarm arises and the bar feed system running interrupts simultaneously with the next chuck open.

2.4. Oil filling and draining
The bar feed system is delivered without oil. 25 litres (7 gallons) of hydraulic oil of any type indicated below must be provided by the client. The oil should be filled into bar feeder before running. Pour the oil into the oil tank directly as shown. The oil height should be kept around H mark on the level when the hydraulic pump is not running.

<table>
<thead>
<tr>
<th>ISO VG 100</th>
<th>Viscosity Index (cSt @ 40°C / 104°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>90.0 ~ 110</td>
</tr>
</tbody>
</table>

Consult your supplier for adequate oil according to the table above.

3. MAINTENANCE
The hydraulic oil quality gets worse with the bar feeder system running continuously. The cutting chips and sludge heap on button of the oil tank and will be pumped into the hydraulic system. These substances will damage the pump, the guiding channel or even bar stock. Therefore, depends on the bar feed system running status, it is recommend to drain and clean the oil tank at least once every 6 months. Follow the procedures below:

- Power OFF the bar feeder system. Confirm most of the oil return to oil tank.
- Remove the remnant tray.
- Place a container with sufficient capacity (minimum: 30 litres) underneath the drain plug.
- Remove the drain plug and drain the oil.
- When the oil tank is empty, clean the sludge inside the tank and bar feed system.
- Clean the drain plug. Apply seal on the plug and screw the drain plug in.
- Refill new oil into the bar feed system until the indicator shows oil level at H (about 25 litres needed). Confirm there is no leaking from the plug.
- Install the remnant tray back.

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

1.1. Description
The loading system is composed of bar magazine, loading fingers and the loading cylinder. This system serves to store bar stocks and load them into the guiding channel. In order to load the bar stocks smoothly during automatic cycles, the loading elements must be properly set up according to the bar stock dimension.

1.2. Layout of the elements

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Bar guiding limiter adjusting knob</td>
</tr>
<tr>
<td>B</td>
<td>Loading finger</td>
</tr>
<tr>
<td>C</td>
<td>Locking system</td>
</tr>
<tr>
<td>D</td>
<td>Dial</td>
</tr>
<tr>
<td>E</td>
<td>Loading cylinder</td>
</tr>
</tbody>
</table>
1.3. Adjustment

To load the bar stock smoothly, loading finger tip is recommended to located between 2/3 and 1 of the bar dimension as shown.

The smooth loading actions are as the following:

<table>
<thead>
<tr>
<th>Round bar</th>
<th>Hex bar</th>
<th>Square bar</th>
</tr>
</thead>
</table>

Please check the dial which indicates the useable range of selection of the bar diameter. Section A allows bar diameter ranging from 3 to 7mm, section B allows bar diameter ranging from 7 to 12mm, and section C allows bar diameter ranging from 12 to 20mm.

Release the adjustment knob, move the guiding limiter to the section according to bar diameter, then lock it in its new location.
2. CHANNEL SET PART I: GUIDING SYSTEM

2.1. Description

The guiding system offers following functions:

1) To keep the pusher at the central of the guiding channel axis.
2) To house the moving/rotating components inside.
3) To seal the section of guiding channel with oil injected hence keep the hydraulic system working performance.

a) Guiding channel:

The system consists of movable channel cover, fixed guiding channels, front tube/telescopic tube and the driving cylinder. The center of guiding channel should be centralized with the spindle axis as precise as possible to minimize the vibration.

The channel opening and closing could be operated by the remote control station under manual mode. When the guiding channel is open, the long pusher is lifted up with the channel cover and disconnected with the chain. The guiding channel is then empty hence allows the action of bar loading and first feed.

When the guiding channel is closed, the long pusher is positioned into guiding channel. The channel cover seals the guiding channel between clamping device and bar length measuring device. Part of pusher assembly and bar stock will be completely housed inside. The hydraulic oil is injected into the space between the guiding channel and pusher/bar stock.

Sets of guiding channel of different dimensions are available. Each dimension of guiding channel is available to load a range of bar stock dimensions. For a best performance of guiding, it is recommended to keep the gap width between bar stock and channel around 1mm.
### b) Front tube / telescopic tube:

The front tube or telescopic tube (also called telescope) functions as an extension of guiding channel. It performs function of guiding channel between the bar feed system and the lathe.

The front tube is a tube with fixed length. It serves specifically for fixed type lathe. The telescopic tube could extend and retract. It's designed specifically for Swiss type lathe since the spindle is movable. A liner inside whose dimension must match the pusher. In addition, an oil collector is mounted under the front / telescopic tube for collecting the leaking oil.

Whenever the channel replacement is needed, check chapter 7.4 for further information.

### 2.2. Layout of the elements

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Movable channel cover</td>
</tr>
<tr>
<td>B</td>
<td>Fixed guiding channel</td>
</tr>
<tr>
<td>C</td>
<td>Oil injection tube</td>
</tr>
<tr>
<td>D</td>
<td>Front tube (for Fixed type lathe) or Telescope (for Swiss type lathe)</td>
</tr>
</tbody>
</table>
3. CHANNEL SET PART II: FEEDING SYSTEM

The feeding system consists of the pusher assembly and chain transmission device. With this system, the motor drives the pusher forward and backward hence achieve following functions:

1) Bar insertion  
2) Bar feeding and moving  
3) Remnant retraction

During automatic mode, there are 2 motion modes for the feeding system:

1) Without synchronization device:
   
   The feeding system pushes forward all the time either the lathe chuck is open or closed. Applied for both fixed and Swiss type lathe.

2) With synchronization device (optional):
   
   When chuck is closed, the feeding system movement is synchronized with the spindle. When the chuck is open, the feeding system feeds forward all the time. This mode applied for Swiss type lathe only. For safety reason, a torque stop interface signal is available for stopping the pusher when chuck is open.

3.1. Chain transmission mechanism

The chain transmission mechanism is composed of servo motor, chain wheels and chain. The chain transmits force between the servo motor and pusher assembly hence drives the pusher assembly and bar stock.

3.2. Pusher assembly

The pusher assembly is composed of an introducer and a pusher. They are carried by the chain. The connection between the pusher and the chain is decided by the position of the channel cover.

The short pusher is a short solid cylinder which also called flag. It is always connected with the chain either the channel is open or closed. When the channel is closed, it simply follows the movement of the long pusher. When the channel is open, its movement mainly serves to position a bar stock to the insertion position.

The long pusher is a long rod which serves to control the bar stock movement either in the bar feeder or lathe spindle. When the channel is open, the long pusher is disengaged from the chain and lifted by the pusher carrier. When the channel is closed, the long pusher engaged with the chain.

Part of the long pusher is able to extend outside the bar feed system. In the other hand, the pusher must enter the spindle to get a shortest remnant. During installation, it must be confirmed that the tip of long pusher is able to contact the rear end of lathe chuck.
3.3. Rotating sleeve

The rotating joint is mounted on the tip of the long pusher and serves to connect the static part (pusher rod) and rotating part (finger chuck). This part decides if both ends of the bar stock rotates at the same speed. Due to its function, this part becomes the most critical index of bar feed system performance. A bad rotating joint could result in serious vibration and big noise. The user is strongly recommended to inspect its status regularly in order to keep the bar feeder running at the best performance.

3.4. Finger component

The finger component is the part to keep the connection between the bar stock and the pusher. When the lathe spindle is turning, the bar stock is supported by the lathe chuck and finger chuck. In order to get a good support during machining, the finger chuck must be properly selected according to the bar stock dimension.

Standard type

The standard type, which also called finger chuck, is a cylinder with flexible jaws that are able to clamp bar stock tip. Each finger chuck matches a specific bar stock dimension only. For profiled bar stock, the finger chuck diameter must be selected according to the virtual circle created by the bar stock corners. Refer to annex table for dimension conversion.
3.5. Layout of the elements

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Long pusher</td>
</tr>
<tr>
<td>B</td>
<td>Short pusher</td>
</tr>
<tr>
<td>C</td>
<td>Pusher carrier</td>
</tr>
<tr>
<td>D</td>
<td>Rotating joint</td>
</tr>
<tr>
<td>E</td>
<td>Finger component</td>
</tr>
<tr>
<td>F</td>
<td>Chain</td>
</tr>
<tr>
<td>M1</td>
<td>Servo motor</td>
</tr>
</tbody>
</table>

3.6. Adjustment of the chain tension

Depending on the application, the chain might get elongated after running a period of time and the chain needs to be tightened again. There are 2 positions for tension adjustment. Whenever the adjustment is needed, check position A and adjust first. If position A is adjusted to its limit, adjust position B instead.

Position A:
- Slightly loose the screws. Manually move the chain wheel backward (toward the motor) and lock the screws.
- Move the motor and wheel set away from the lathe and tighten again.
Position B:
Slightly loosen the two screws as shown. Manually move the chain wheel forward (toward the lathe) and lock the screws.

3.7. Changeover / installation procedures of finger chuck component

Depends on the diameter of bar stocks, the finger component must be replaced accordingly.

- When the pusher is at home position. Open the guiding channel.
- Replace the finger chuck / rotating joint.
4. CHANNEL SET CHANGEOVER PROCEDURE

4.1. Description
The channel set is composed of components of guiding system (chapter 7.2) and feeding system (chapter 7.3). Once the bar stock diameter exceeds the available dimension of the channel. The whole channel set elements must be replaced.

4.2. Layout of the elements

4.3. Changeover procedure

- Close the guiding channel.
- Move pusher to position 1400.
- Open the guiding channel.
- Move the pusher back to home position and press the emergency stop button.
- Remove the long pusher, short pusher and pusher carriers.
- Loose the set screws of guiding channels and replace the channels.
- Install short pusher and long pusher (with rotating joint).
- Mount the pusher carriers.
- Reset the emergency stop button. Move pusher to position 1400 and close the channel cover.
- Move the pusher to home position.
### 4.4. Channels set selection

When the customer needs to change the channel size, following parts must be replaced accordingly:

<table>
<thead>
<tr>
<th>Lathe Type</th>
<th>Parts need to be ordered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed type</td>
<td>Channel set + rotating sleeve + Front tube</td>
</tr>
<tr>
<td>Swiss type</td>
<td>Channel set + rotating sleeve + Telescope</td>
</tr>
</tbody>
</table>

**Guiding sets**

<table>
<thead>
<tr>
<th>BF length</th>
<th>Loading Side</th>
<th>Channel Ø</th>
<th>Guiding set Reference</th>
<th>Front tube (^1) (for fixed type lathe)</th>
<th>Telescope (for Swiss type lathe)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RtoL/F</td>
<td>8</td>
<td>XHP08-32-1-E1</td>
<td>STT08-length</td>
<td>XT193060800</td>
</tr>
<tr>
<td>3M</td>
<td></td>
<td>11</td>
<td>XHP11-32-1-E1</td>
<td>STT11-length</td>
<td>XT193061100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14</td>
<td>XHP14-32-1-E1</td>
<td>STT14-length</td>
<td>XT193061400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17</td>
<td>XHP17-32-1-E1</td>
<td>STT17-length</td>
<td>XT193061700</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19</td>
<td>XHP19-32-1-E1</td>
<td>STT19-length</td>
<td>XT193061900</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21</td>
<td>XHP21-32-1-E1</td>
<td>STT21-length</td>
<td>XT193062100</td>
</tr>
<tr>
<td>LtoR/F</td>
<td></td>
<td>8</td>
<td>XHP08-32-2-E1</td>
<td>STT08-length</td>
<td>XT193060800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11</td>
<td>XHP11-32-2-E1</td>
<td>STT11-length</td>
<td>XT193061100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14</td>
<td>XHP14-32-2-E1</td>
<td>STT14-length</td>
<td>XT193061400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17</td>
<td>XHP17-32-2-E1</td>
<td>STT17-length</td>
<td>XT193061700</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19</td>
<td>XHP19-32-2-E1</td>
<td>STT19-length</td>
<td>XT193061900</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21</td>
<td>XHP21-32-2-E1</td>
<td>STT21-length</td>
<td>XT193062100</td>
</tr>
<tr>
<td>RtoL/F</td>
<td></td>
<td>8</td>
<td>XHP08-37-1-E1</td>
<td>STT08-length</td>
<td>XT193060800</td>
</tr>
<tr>
<td>12'</td>
<td></td>
<td>11</td>
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<td>STT11-length</td>
<td>XT193061100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14</td>
<td>XHP14-37-1-E1</td>
<td>STT14-length</td>
<td>XT193061400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17</td>
<td>XHP17-37-1-E1</td>
<td>STT17-length</td>
<td>XT193061700</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19</td>
<td>XHP19-37-1-E1</td>
<td>STT19-length</td>
<td>XT193061900</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21</td>
<td>XHP21-37-1-E1</td>
<td>STT21-length</td>
<td>XT193062100</td>
</tr>
<tr>
<td>LtoR/F</td>
<td></td>
<td>8</td>
<td>XHP08-37-2-E1</td>
<td>STT08-length</td>
<td>XT193060800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11</td>
<td>XHP11-37-2-E1</td>
<td>STT11-length</td>
<td>XT193061100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14</td>
<td>XHP14-37-2-E1</td>
<td>STT14-length</td>
<td>XT193061400</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>XHP17-37-2-E1</td>
<td>STT17-length</td>
<td>XT193061700</td>
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<tr>
<td></td>
<td></td>
<td>19</td>
<td>XHP19-37-2-E1</td>
<td>STT19-length</td>
<td>XT193061900</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21</td>
<td>XHP21-37-2-E1</td>
<td>STT21-length</td>
<td>XT193062100</td>
</tr>
</tbody>
</table>

1) **Length:** The front tube length. Four lengths are available: 120, 260, 310 and 400 mm.
### Rotating sleeves, adaptations, Finger chucks

<table>
<thead>
<tr>
<th>Channel size</th>
<th>Rotating sleeve</th>
<th>Adaptation</th>
<th>Finger chuck (ref. to max. OD of chuck)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08</td>
<td>015.15.1064/7</td>
<td>---</td>
<td>015.15.053/7</td>
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<td>028.031.024</td>
<td>015.15.053/10</td>
</tr>
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<td>14</td>
<td>015.031.013/10</td>
<td>028.031.034</td>
<td>015.15.053/10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>028.031.044</td>
<td>015.15.053/12</td>
</tr>
<tr>
<td>17</td>
<td>015.031.013/15</td>
<td>028.031.054</td>
<td>015.15.053/10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>028.031.064</td>
<td>015.15.053/12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>028.031.064</td>
<td>015.15.053/14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>028.031.074</td>
<td>015.15.053/16</td>
</tr>
<tr>
<td>19</td>
<td>015.031.013/15</td>
<td>028.031.084</td>
<td>015.15.053/10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>028.031.094</td>
<td>015.15.053/12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>028.031.094</td>
<td>015.15.053/14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>028.031.104</td>
<td>015.15.053/16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>028.031.104</td>
<td>015.15.053/18</td>
</tr>
<tr>
<td>21</td>
<td>015.031.013/15</td>
<td>028.031.124</td>
<td>015.15.053/12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>028.031.124</td>
<td>015.15.053/14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>028.031.134</td>
<td>015.15.053/16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>028.031.134</td>
<td>015.15.053/18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>028.031.144</td>
<td>015.15.053/20</td>
</tr>
</tbody>
</table>

#### Example:
- **Example1:**
  If the user wants to change the current channel from someone to 21. The bar feed system is 12", the lathe is fixed type and the front tube length is 260. He has to order:

  XTP21-20-37-E1 and STT21-260

- **Example2:**
  If the user wants to change the current channel from someone to 17. The bar feed system is 3m and the lathe is Swiss type. He has to order:

  XTP17-16-32-E1 and XT193061700.
5. MATERIAL CLAMPING DEVICE

5.1. Description

The material clamping device serves to fix the material when the pusher is proceeding to the insertion or retraction. Independently of the material, the diameter, or the bar profile, the clamping blades are invariably the same and do not require any adjustment.

5.2. Layout of the elements

![Diagram of the elements](image)

<table>
<thead>
<tr>
<th>Designation</th>
<th>Article No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-</td>
<td>Clamping blades</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>Clamping jaw in clamped position sensor.</td>
</tr>
<tr>
<td>C</td>
<td>-</td>
<td>Clamping device cylinder</td>
</tr>
</tbody>
</table>

5.3. Replacement of the blades

The clamping blades must be replaced when worn out. Proceed the procedures below:

1. Unscrew the screws (A) the removed the worn blades (B).
2. Install the new blades and tighten with the removed screw.
6. FRONT REST DEVICES

6.1. Description

The front rest device serves to constrict the rotating bar stock on central of the bar feeder by 4 wheels which activated by cylinder. When the bar stock vibrates and contacts with wheels, the bar stock slides over wheels surface hence avoid directly impact and noise.

One standard front rest device is mounted on front of the bar feed system. For Swiss type lathe, an optional spindle attached front rest is available and offered by request.

6.2. Layout of the elements

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Blower</td>
</tr>
<tr>
<td>B</td>
<td>Clamping adjustment</td>
</tr>
<tr>
<td>C</td>
<td>Releasing adjustment</td>
</tr>
<tr>
<td>D</td>
<td>Scale</td>
</tr>
</tbody>
</table>
6.3. Adjustment

To avoid friction between the bar stock and the guiding elements, the guiding elements should NEVER clamp the bar stock. There should be 1mm gap between the bar stock and the guiding elements. For profiled bar stocks, the gap should be kept between the elements surface and the virtual circle formed by bar stock corners. For profiled bar stocks, specific guiding elements machined at the correct diameter are available.

![Standard V element](image1)

![Round element for profiled bar stocks](image2)
7. BAR LENGTH MEASURING DEVICE

The TOP CUT position is defined by the position of the bar tip machining process applied on a new bar stock right after it’s loaded into the lathe. The purpose is to get a qualified tip surface able to serve as a reference for positioning bar stock during machining. Generally, this process will be proceed in the bar change sub-program and only do once for each bar. Depending on the tooling layout, this position could be placed on any position outside the lathe chuck (mostly 30 to 50mm from the lathe chuck surface).

The bar length measuring device serves to measure the distance that a bar stock is being pushed out of the bar feeder. During bar feeder loading cycle, the bar length device cylinder is activated and positions a flap on front opening of the guiding channel as soon as the loading fingers are activated. When the bar feed system advances the bar stock forward and the bar tip hits the flap, the PLC reads the signal from the bar length device sensor and starts to measure the bar stock moving distance. When the bar tip arrives in TOP CUT (P05) position, a START signal will be sent through relay A2 to the lathe. Then the pusher either keep moving forward or holds at the position according to the service parameter set up.

Since the bar length measuring sensor is only activated by the bar tip, please note that the TOP CUT distance is independent from the bar stock length. Once the bar feeder position is fixed, the TOP CUT position is only related to the distance from the bar feeder to the lathe chuck surface.
8. AIR BLAST RING

The air blast ring is mounted over the bar feed system exit which is driven by solenoid valve YV5. It serves to build an air curtain which creates forceful air pressure on the bar stock surface when the bar stock pass through it. The pressure functions as a virtual seal which keeps the hydraulic oil inside the air curtain.

The air blast right blows at 2 situations below:

1. Anytime when the pusher is moving forward either manually or automatically.
2. While the bar feeder is doing FIRST FEED.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Air blast ring</td>
</tr>
<tr>
<td>B</td>
<td>Set collar</td>
</tr>
<tr>
<td>C</td>
<td>Front tube / telescope</td>
</tr>
</tbody>
</table>

The ring must be mounted during installation. Refer to figure below for correct installation direction.
9. LATHE CONNECTING PARTS (OPTION)

The lathe connecting parts, or simply called connecting parts, are composed of brackets which serve to connect the lathe spindle and bar feed system. One end of the connecting parts set is always attached to the lathe spindle. The other end of connecting parts set could be connected either with optional front rest or simply the front tube / telescope.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Connecting parts (optional)</td>
</tr>
<tr>
<td>B</td>
<td>Second front rest (optional)</td>
</tr>
<tr>
<td>C</td>
<td>Front tube or telescope (optional)</td>
</tr>
</tbody>
</table>

The connecting parts design varies with the lathe type and brand. Diagram of connecting parts shipped with the bar feeder was placed inside the accessories box. Refer to the diagram to do the installation.
10. BAR PREPARATION

Bar preparation is the machining process which changes the shape of bar tip. It aims to get an improved insertion process during automatic process. The bar preparation must be selected according to the finger component the user chose.

a) Chamfering

This very basic and necessary preparation is strongly recommended to be applied on each bar stock when a finger chuck is selected.

b) Turning down

Due to strength concern, the maximum finger chuck size within a guiding channel specification is limited by its own wall thickness and therefore the maximum loaded bar stock diameter is limited. To maximize the bar stock diameter, the user is recommended to turn down the bar tip as shown. The maximum bar stock diameter should be kept 1mm below the guiding channel.
1. CONTROLS

1.1. Remote control

The remote control offers interface signal indicating LED’s and buttons for operating the bar feed system when it’s in MANUAL mode.

1.2. Signal display area

OPEN: Indicates the lathe chuck is open/closed when the LED is ON/OFF.
START: Indicates the START signal is ON/OFF when the LED is ON/OFF.
BAR END: Indicates the BAR END signal is ON/OFF when the LED is ON/OFF.
ALARM: Indicates the ALARM signal is ON/OFF when the LED is ON/OFF.

1.3. Status indication area

Top-Red light

This LED will be ON when

- Powering up the bar feeder. After initialization of the HMI the LED will turn OFF.
- There is a communication failure between the PLC and the HMI.

Middle-green light

The RS-232 interface is not used and the LED remains OFF.

Bottom-Green light

The RS-485 LED indicates communication activity between the PLC and HMI.
CHAPTER 8: OPERATION

Emergency stop
When a dangerous situation arises, pressing the emergency stop button immediately interrupts the bar feed system. The bar feed system will send alarm signal to the lathe and interrupt the lathe if interface is wired accordingly. Error message e01 will be shown on the HMI display.

To cancel the alarm, release the button by rotating it clockwise and pressing the MANUAL mode key.

AUTO ready
To switch the bar feeder to AUTOMATIC ready mode. In AUTOMATIC ready mode, the key LED is ON. The bar feed system is available to be switched to AUTOMATIC mode.

To switch to AUTOMATIC ready mode, one of the following conditions must be fulfilled:

• The channel is closed and the pusher is NOT at home position.
  OR
• The channel is open and the pusher is at home position and the measurement device in upper position (sensor SQ1 ON).

AUTO START
To switch the bar feeder to AUTOMATIC mode. In AUTOMATIC mode, the key LED is ON. The bar feed system is running the automatic sequence controlled by the lathe.

To switch to AUTOMATIC mode, the following conditions must be fulfilled:

• the bar feed system in AUTOMATIC READY mode.
  AND
• the channel is closed and the pusher is NOT at home position.
  OR
• the channel is open, the pusher is at home position and the measurement device in upper position (sensor SQ1 ON).

MANUAL
This button offers two functions:

• Switch the bar feed system to MANUAL mode. When the bar feeder is on MANUAL mode, the key LED is ON and the user could operate the bar by function keys.
• Reset the bar feed system from an emergency stop.

Rightward
Move pusher rightward. Only available when the bar feed system is in MANUAL mode.
**Slow Rightward**
Move the pusher rightward with 10% of the general forward speed. Only available when the bar feed system is in **MANUAL** mode.

**Leftward**
Move the pusher leftward. Only available when bar feed system is in **MANUAL** mode.

**Slow leftward**
Move the pusher leftward with 10% of the general forward speed. Only available when the bar feed system is in **MANUAL** mode.

**Open Channel**
By pressing this button, the channel opens by proceeding sequence below automatically:
- The short pusher moves forward to the material clamping device.
- The material clamping device clamps the material and the pusher retracts hence the material is removed from the finger chuck.
- The channel opens.

To operate this button, the following conditions must be fulfilled:
- The bar feed system is in **MANUAL** mode
- The pusher is at home position (sensor SQ2 ON)

**Load bar**
When the channel is open, press the key again to load a bar and reset the measurement device.

**Close Channel**
By pressing this button, the actions below will be proceeded by sequence automatically:
- The short pusher moves forward to the material clamping device.
- The material clamping device clamps and the pusher retracts to home position.
- Channel close and the pusher charges forward for insertion.

To operate this button, the following conditions must be fulfilled:
- The bar feed system is in **MANUAL** mode
- The pusher is at home position (sensor SQ2 ON)
2. ONBOARD HMI (human-machine interface)

The interface allows the user to read messages and set parameters.

2.1. Text display area

The display provides parameters, status information and error messages:

After powering up the screen shown left above is displayed. Press key to switch to the Parameter screen as shown on the right. In the Parameter screen 3 selections are available:

1. F0/F5: To access the OPERATION PARAMETER screen. Refer to Chapter 8.5.
2. F1/F6: To access the SERVICE PARAMETER screen. Refer to Chapter 8.6.
3. F2/F7: To display the software version. Both HMI and PLC has their own software as shown. This information is sometimes necessary when you contact us for technical support.

Software Version

HMI: ALPHAST320-V_latest
PLC: ALPHAST320-x Latest
2.2. Command keys

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="up.png" alt="Up" /></td>
<td>Increase / decrease the numerical value of a specific digit. Example: If one digit is “4”, increase it to “5” by pressing or decrease it to “3” by pressing .</td>
</tr>
<tr>
<td><img src="left.png" alt="Left" /> <img src="right.png" alt="Right" /></td>
<td>Move the blinking cursor to the left / right. Example: If the cursor is current staying at “4” of number “345”, move it to digit “3” by pressing or move the cursor to “5” by pressing .</td>
</tr>
<tr>
<td><img src="esc.png" alt="Esc" /></td>
<td>By pressing this key to exit from a parameter setup page without changing the setting.</td>
</tr>
<tr>
<td><img src="enter.png" alt="Enter" /></td>
<td>Use this key to validate a new parameter setting.</td>
</tr>
</tbody>
</table>

2.3. Numerical key pad

Shown as , , , , , and . They serve to enter numbers or execute functions attributed to them.

1. When editing parameter values, the key pad can be used as alternative to the previously described Up/Down keys. Numbers are entered according to the following table:

<table>
<thead>
<tr>
<th>Number</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Combination</td>
<td>F1/F6</td>
<td>F2/F7</td>
<td>F3/F8</td>
<td>F4/F9</td>
<td>Shift</td>
<td>Shift</td>
<td>Shift</td>
<td>Shift</td>
<td>Shift</td>
</tr>
</tbody>
</table>

2. On some screens, functions are assigned to the keys. The assigned function is indicated by an icon displayed above the corresponding key. In the screen shown below, the F4/F9 key can be used to return to the previous screen.

2.4. Status Indication Area

**Alarm (red)**
This LED will be ON when:
- Powering up the bar feeder. After initialization of the HMI the LED will turn OFF.
- There is a communication failure between the PLC and the HMI.

**RS-485 (green)**
The RS-485 LED indicates communication activity between the PLC and HMI. The RS-232 interface is not used and the LED remains OFF.
3. POWERING

The motor of the ALPHA ST320 S2 bar feed system is equipped with a built-in absolute encoder that continuously controls the position of the carrier. 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 pusher position value saved is immediately taken into account, thus avoiding any input from the beginning. The PLC reads signals from sensors and gives the operator allowable operations only.

**Notice:** Do not change the pusher position when bar feed system is powered OFF. If it's found the position reading does not match the pusher's actual position. For example, when pusher is at home position, the current position is not 0. Take any approach below to reset the original position:

1. Move the pusher back to home position. Power the bar feed system OFF and ON.
2. Move the pusher back to home position. Pressing the button toward home position for 3 seconds.
4. EMERGENCY STOP BUTTON

When there is a dangerous situation arising, pressing one of the emergency stop buttons starts actions below and interrupts the bar feed system and the lathe (if interface wired accordingly):

- The 3 phases 220V AC to servo amplifier is interrupted;
- All the output signals of PLC are interrupted except Y04 (input signal of relay R1);
- An alarm e01 is arising at HMI.

When the emergency situation is fixed, release the emergency stop button and press the manual key on the remote control to restart the bar feed system.

Emergency stop button on the remote control STP1
5. AUTOMATIC SEQUENCE

The ALPHA ST320 S2 bar feed system could be switched into AUTOMATIC mode at two timings.

5.1. Starting a new machining

Warning:
Conditions must be fulfilled:
1. The lathe is not in AUTOMATIC mode.
2. The lathe chuck is open.
3. The lathe stopper must be positioned at the TOP CUT position.

Move the pusher to its origin reference and confirm the current pusher position is 0.
− Open the channel.
− Load a new bar stock by pressing the channel open button.
− Press the channel open button again to reset the loading finger.
− Switch the bar feed system into AUTOMATIC mode.
− Switch the lathe into AUTOMATIC mode.

The bar feed system advances the bar stock to TOP CUT position and sends START signal.

5.2. Continue an interrupted machining:

Warning:
Conditions below must be fulfilled:
1. The lathe is not in AUTOMATIC mode.
2. The lathe chuck is open.
3. The lathe stopper is positioned at part length position.
4. The bar feed system channel is closed and pusher is not at origin reference.

Manually move the pusher forward until the bar stock pushes against the stopper.
− Close the lathe chuck.
− Switch the bar feed system into AUTOMATIC mode.
− Switch the lathe into AUTOMATIC mode.
6. OPERATION PARAMETERS

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

The operation parameters are most frequently changed parameters for controlling the bar feeder when it’s in AUTOMATIC mode. All the operation parameters could be changed according to the machining requirement. To achieve the best performance, the operator is strongly recommended to read this chapter before proceeding any modification.

6.1. Accessing and editing parameters

After selecting the operation parameters the following screen will be displayed:

Navigation:
Page Up / Down through the parameter screens.

Edition:
- Press F0 for the 1st parameter displayed
- Press F1 for the 2nd parameter displayed
- Press F2 for the 3rd parameter displayed

Validation of the changes:
After editing the value you must press the key to confirm the new setting.
### Chapter 8: Operation 8-11

#### 6.2. Quick preview

<table>
<thead>
<tr>
<th>Page</th>
<th>Parameter name</th>
<th>Parameter description</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>Bar stock setup</td>
<td>Bar diameter</td>
<td>F0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Torque adjustment</td>
<td>F1</td>
</tr>
<tr>
<td>P02</td>
<td>Product setup</td>
<td>Part length</td>
<td>F0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Speed reduction distance</td>
<td>F1</td>
</tr>
<tr>
<td>P03</td>
<td>Feeding speed setup</td>
<td>Feeding speed</td>
<td>F0</td>
</tr>
<tr>
<td>P04</td>
<td>Bar change setup</td>
<td>BAR END position</td>
<td>F0</td>
</tr>
<tr>
<td>P05</td>
<td>TOP CUT setup</td>
<td>TOP CUT position</td>
<td>F0</td>
</tr>
<tr>
<td>P06</td>
<td>Front rest and oil pump setup</td>
<td>First front rest</td>
<td>F0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oil pump</td>
<td>F1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Second front rest</td>
<td>F2</td>
</tr>
<tr>
<td>P07</td>
<td>Safety setup</td>
<td>Minimum allowable feeding length when chuck is open.</td>
<td>F0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum allowable pusher moving distance when chuck is closed.</td>
<td>F1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum allowable feeding length when chuck is open.</td>
<td>F2</td>
</tr>
<tr>
<td>P08</td>
<td>FIRST FEED</td>
<td>FIRST FEED position</td>
<td>F0</td>
</tr>
<tr>
<td>P09</td>
<td>Chuck open timer</td>
<td>Timer for chuck open</td>
<td>F0</td>
</tr>
<tr>
<td>P10</td>
<td>Dry run</td>
<td>Barfeeder in dry run mode</td>
<td>F0</td>
</tr>
<tr>
<td>P11</td>
<td>Front rest in manual mode</td>
<td>Front rest in manual mode</td>
<td>F0</td>
</tr>
</tbody>
</table>
6.3. User parameters description (F0)

**P01 : Bar stock setup**

Setup related to feeding force. The overall pushing force is composed by values of Bar diameter (basic pushing force) and Torque offset (advanced pushing force).

**Bar diameter:**
This parameter decides the basic pushing force. Enter the bar stock diameter currently loaded inside the channel.

**Torque offset:**
This parameter allows the operator to make adjustment in case addition pushing force is needed. Values are available from 0 to 26 at this parameter. Take the currently installed channel set dimension as a beginning and adjust it according to actual pushing status. If 0 is entered here, no additional pushing force will be added.

**P02 : Feeding distance setup**

Setup related to feeding distance.

**Part length:**
Overall feeding length needed for making a part. Part length plus cut off tool width.

This value is for calculation of BAR END position and timing of sending CYCLE START signal (refer to MODE 15). The bar feeder will not stop at this distance during feeding. The lathe must place a stopper inside the lathe for positioning.

**Example:** If the part is 100mm and the cut off tool width is 3mm. The value entered here is 100+3=103.

**Slow dist :**
The distance where the pusher reduces it's feeding speed prior to arrive at part length set above during feeding.

The purpose is to prevent the impact between bar stock and stopper.

**Note:** This setup only applied on general feeding but not TOP CUT feeding.
**P03: Feeding speed setup**

Setup related to feeding speed. This parameter results in different influence according to different service parameter setup.

<table>
<thead>
<tr>
<th>Lathe type</th>
<th>Pusher speed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed headstock</strong> (mode10=0)</td>
<td></td>
</tr>
<tr>
<td>Chuck open</td>
<td>Controlled by P03</td>
</tr>
<tr>
<td>Chuck close</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Swiss type</strong> (mode10=1)</td>
<td></td>
</tr>
<tr>
<td>Chuck open</td>
<td>Mode 13=0 (without synchronization)</td>
</tr>
<tr>
<td></td>
<td>Mode 13=1 (with synchronization)</td>
</tr>
<tr>
<td>Chuck close</td>
<td>Controlled by P03</td>
</tr>
<tr>
<td></td>
<td>Controlled by synchronization</td>
</tr>
</tbody>
</table>

This parameter should be modified if the spindle moving speed has changed.

**P04: Bar change setup**

Current position: (read only)
The current pusher position measured from home position sensor SQ2.

Bar end cycle: (read only)
Number of BAR END signals sent to the lathe. For every bar one BAR END signal is sent. This counter is an indicator for the total number of loading cycles the bar feeder has performed.

Bar end point:
- The pusher position where the remaining bar stock length is inadequate to make a complete part according to P02 setup when the pusher travels to here. Generally it’s called **BAR END** or **END of BAR** position.
- Setup:
  Move the pusher (with finger chuck installed) forward until it touches against the lathe chuck. Deduct the value of “Position” on the display by 10 as BAR END position.
- When the pusher arrives this position during AUTOMATIC mode, the bar feed system sends a BAR END signal to the lathe and proceeds the bar change process accordingly.

This parameter should be modified if the barfeeder is re-installed or moved.
### P05: Top Cut setup

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current position: (read only)</td>
<td>The current pusher position measured from pusher origin sensor SQ2.</td>
</tr>
<tr>
<td>Reference: (read only)</td>
<td>The current bar tip position measured from bar length measuring device SQ1.</td>
</tr>
</tbody>
</table>

**Top cut:**

- **Definition:**
  The position where the lathe applied bar tip machining on new loaded bar stock for getting a better reference surface. The term TOP CUT presents both the machining itself and the position to proceed it.

- **Setup:**
  - Load a new bar stock by **Open channel** button.
  - Close the channel.
  - Move the bar stock into the spindle until the bar tip arrives at the desired position for the operator.
  - Read value of “Reference” shown and enter TOP CUT.

  - This position is specifically measured from sensor SQ1 and for controlling the distance that the bar tip travels from bar feed system. With this configuration, this value is independent from bar length. Once it’s setup, this value will not need to be changed unless the bar feeder is moved.

  - During automatic cycle, the sensor SQ2 is activated with the bar loading action simultaneously. When the new bar stock hits the device, the PLC start to counter the distance. When this distance is reached, the bar feed system stops the pusher and sends a START signal to the lathe.

### P06: Front rest setup

This page includes parameters for driving front rest devices and hydraulic pump during AUTOMATIC mode.

- The front rest is a device for clamping the rotating bar stock during machining in order to minimize the vibration. It must open before the pusher passes through it to prevent its rollers to be damaged by pushers rotating components.

- The hydraulic pump is recommended to turn OFF when the bar stock is completely fed out of the guiding channel.

#### Current position: (read only)
The current pusher position measured from home position SQ2.

- **1st:** The pusher position where the first front rest opens.
- **2nd:** The pusher position where the hydraulic pump turns OFF.
- **Option:** The pusher position where the second front rest (optional) opens.
**P07: Safety setup**

This parameter should be modified if the part dimension has changed.

The minimum/maximum acceptable bar stock feeding / pusher moving distance could be monitored by bar feed system under different conditions. The bar feed system activates alarm accordingly if those values are exceeded. Refer to chapter 9 for further information.

<table>
<thead>
<tr>
<th>Fixed type lathe</th>
<th>Swiss type lathe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too short dist</td>
<td>The minimum allowable bar fed distance from chuck open to close.</td>
</tr>
<tr>
<td>Too long dist_ *</td>
<td>The maximum allowable pusher moving distance when chuck is closed.</td>
</tr>
<tr>
<td>Too long dist_ #</td>
<td>The maximum allowable bar feeding distance from chuck open to close</td>
</tr>
<tr>
<td></td>
<td>The maximum allowable pusher moving distance when chuck is open.</td>
</tr>
</tbody>
</table>

**P08: First feed setup**

Position: (read only)
The current pusher position measured from sensor SQ2.

1st feed dist:
The bar stock’s first movement right after it’s loaded into the bar feed system which proceeded by short pusher.
This movement is called **FIRST FEED**. Its function is to locate the bar rear tip at the insertion position.
The FIRST FEED must correctly set so that the gap between the bar rear tip and finger chuck is within 5mm after channel is closed.

Insert position:
Insert position of the pusher. It must be adjust to ensure the proper insertion of the bar stock into the finger chuck. (default: 33mm)

Extract position:
Pusher position for remnant extracting before the clamping device closes and the pusher returns to the home position. (Default: 50mm)

In auto mode, the extraction process is as follows:

1. The pusher go to position P08 “extract position”, clamp device closes, Pusher go back to extract the remnant.
2. The pusher moves forward to position P08 “extract position” + 100mm to push the remnant in the remnant box.
3. The pusher go back to P08 “extract position” and the clamping device closes again to verify absence of remnant.
**P09: Chuck close postponement**

Chuck close delay:
- The time postponed for initiating PUSHING FORCE.
- This timer starts to count when the chuck closes after the pusher arrives at TOP CUT position.
- This parameter is only available when MODE 8 = 1. The time unit is 0.1 second.

| P09 | Chuck close delay: [0.0] |

**P10: Mode Dry Run**

Position: (read only)
The current pusher position measured from sensor SQ2.

Dry run:
If this function is activated, actions below will be executed when the bar feed system turned to AUTOMATIC mode:

1. AUTO button led is blinking.
2. HMI texts are blinking.
3. Deactivate check items below:
   1) Hydraulic pressure.
   2) Too long / too short
   3) Remnant check
   4) Magazine empty
   5) TOP CUT position
4. During automatic mode, the pusher stops after every fed out except the synchronization function is activated.
5. During automatic mode, the bar feed system stops before every FIRST FEED. AUTO START button should be pressed to continue the automatic sequence.

This function is created for the connection. It must be turned OFF when the installation is accomplished.

| P10 | Dry Run state [OFF] |

**P11: Manual mode of the front rest**

Current position: (read only)
The current pusher position measured from sensor SQ2.

Manual Mode:
If this function is activated, Front rest operates in manual mode.

| P11 | Front Rest Manual Mode [OFF] |

Press "F0" -> Change
7. SERVICES PARAMETERS

Service parameters must only be modified by technicians of or personnel authorized by LNS. Incorrect setup might cause unexpected malfunction or damage on either bar feed system or lathe. Accessing these parameters is password protected. Please contact LNS or its official agent in your country for getting technical support in case any modification is needed.

7.1. Accessing

After selecting the operation parameters, the following screen will be displayed:

**MODE 1: Simulation**

When this MODE is ON, the bar feed system runs feeding and bar change cycles automatically and not controlled by either interface signals or manual operation.

This MODE is for factory test or exhibition purpose only. When it's connected with the lathe, it must always be turned OFF.

0 - Turn SIMULATION OFF  
1 - Turn SIMULATION ON
Note: MODE 2, 3, 4, 5, 28, 29 and 30 are related to interface logic setup. Those parameters are only available when related interface wires are connected accordingly.

**MODE 2 : Chuck signal (A1) logic setup**

<table>
<thead>
<tr>
<th>0</th>
<th>CHUCK signal is ON when chuck is open</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CHUCK signal is OFF when chuck is open</td>
</tr>
</tbody>
</table>

Mode 2:

A1—Spindle Chuck
NO-0; NC-1

Press "F0"->"0","1"

**MODE 3 : CNC auto signal (A2) logic setup**

Bar feeder must receive the A2 signal before being putted in auto mode

<table>
<thead>
<tr>
<th>0</th>
<th>Lathe auto signal (A2) is activated when the lathe is in auto mode (i.e. receiving A2 for allowing “all pushing forward actions”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lathe auto signal (A2) is activated when the lathe is in auto mode (i.e. receiving A2 for not allowing “all pushing forward actions”).</td>
</tr>
</tbody>
</table>

Note:

Mode 3:

A2—Lathe in auto
NO-0; NC-1

Press "F0"->"0","1"

**MODE 4 : Start loading Signal (A3) logic setup**

<table>
<thead>
<tr>
<th>0</th>
<th>When the START LOADING signal is ON, the loading cycle is initiated.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>When the START LOADING signal is OFF, the loading cycle is initiated.</td>
</tr>
</tbody>
</table>

Mode 4:

A3—Start loading
NO-0; NC-1

Press "F0"->"0","1"

**MODE 5 : Pushing Signal (A4) logic setup 1of 2**

The pushing signal allows the lathe to control the pushing force during machining operations.

<table>
<thead>
<tr>
<th>0</th>
<th>Pushing signal (A4) prohibits pusher forward actions during machining (If the lathe don’t provide A4, mode 5=0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pushing signal (A4) allows pusher forward actions during machining</td>
</tr>
</tbody>
</table>

Mode 5:

A4—Part feed out
NO-0; NC-1

Press "F0"->"0","1"
CHAPTER 8: OPERATION

**MODE 6 :**

This parameter originally is left blank.

**MODE 7 : Bar change setup 1 of 3 (refer to MODE 19 and 12 for further information)**

Define the approach of initiating bar change cycle.

0 – BACK START signal (A3) initiates the loading cycle.

**Note:** Before the bar change cycle is initiated, MODE 12 or pushing signal (A4) decides if pushing force is applied on pusher.

1 – The loading cycle is initiated according to MODE19 set up.

**MODE 8 : TOP CUT positioning approach setup**

0 – The stopper inside the lathe stops the bar stock at TOP CUT position.

The pusher positions the bar stock to TOP CUT position, the bar feed system sends START signal to the lathe and the pusher keep pushing forward.

This approach offers the best accuracy of positioning.

1 – The pusher positions the bar stock according to P05 and sends the START signal

**MODE 9 : Remnant treatment setup**

0 – The remnant is retracted inside the bar feed system with auxiliary of material clamping device.

1 – The remnant is ejected into the lathe by new bar stock.

**Note:** The pusher finger chuck should be replaced by push type accordingly.
## MODE 10: Lathe type setup 1 of 3 (refer to MODE 21, 22 for related setup)

<table>
<thead>
<tr>
<th>Mode 10:</th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNC Type</td>
<td>0</td>
<td>Swiss-1</td>
</tr>
<tr>
<td>Fix-0; Swiss-1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Lathe type setup 1 of 3 (refer to MODE 21, 22 for related setup)**

0 – The lathe is fixed type.

1 – The lathe is Swiss type.

---

## MODE 11: Feeder status check

**Feeder status check**

This parameter checks if the bar feed system is in AUTOMATIC mode when the chuck signal is turned ON/OFF for 3 cycles. If not, the bar feed system activates the alarm e11.

<table>
<thead>
<tr>
<th>Mode 11:</th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeder safety</td>
<td>0</td>
<td>Yes-1</td>
</tr>
<tr>
<td>No-0; Yes-1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Feeder status check**

0 – Deactivate this check.

1 – Activate this check.

---

## MODE 12: Bar change setup 3 of 3 (refer to MODE 7 and 19 for further information)

**Bar change setup 3 of 3 (refer to MODE 7 and 19 for further information)**

Defines pusher action between chuck open and the next bar feed system action when BAR END signal is currently arising.

0 – The pusher keep pushing forward. VERIFIER SI INVERSER

1 – The pusher terminates pushing force.

<table>
<thead>
<tr>
<th>Mode 12:</th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>No BarEnd Torque</td>
<td>0</td>
<td>Yes-1</td>
</tr>
<tr>
<td>No-0; Yes-1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Bar change setup 3 of 3 (refer to MODE 7 and 19 for further information)**

0 – The pusher keep pushing forward. VERIFIER SI INVERSER

1 – The pusher terminates pushing force.

---

## MODE 13: Synchronization device (optional) setup 1 of 2 (refer to MODE 29 for related setup)

**Synchronization device (optional) setup 1 of 2 (refer to MODE 29 for related setup)**

0 – Activate synchronization device.

1 – Deactivate synchronization device.

<table>
<thead>
<tr>
<th>Mode 13:</th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronization</td>
<td>0</td>
<td>Yes-1</td>
</tr>
<tr>
<td>No-0; Yes-1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Synchronization device (optional) setup 1 of 2 (refer to MODE 29 for related setup)**

0 – Activate synchronization device.

1 – Deactivate synchronization device.
**MODE 14 : Bar end signal (R3) setting**

Defines the timing to activate BAR END signal.

<table>
<thead>
<tr>
<th>Mode 14:</th>
<th>Y06 barend setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - check P02</td>
<td>0</td>
</tr>
<tr>
<td>1: no check P02</td>
<td>1</td>
</tr>
</tbody>
</table>

| Press "F0"->"O"."1" |

0 – BAR END signal is calculated according to P02 “Part length” and P04 “Bar end position”

1 – BAR END signal is given according to P04 “bar end position”

**MODE 15 : PLC output setup (R2) 1 of 2 (refer to MODE 16 for further information)**

<table>
<thead>
<tr>
<th>Mode 15:</th>
<th>Y05-&gt;Cycle start</th>
</tr>
</thead>
<tbody>
<tr>
<td>No-0; Yes-1</td>
<td></td>
</tr>
</tbody>
</table>

| Press "F0"->"O"."1" |

0 – Y05 is ON when a new bar stock arrives at TOP CUT position.

This signal is called START signal.

1 – Y05 acts according to MODE 16 setup.

**MODE 16 : PLC output contact Y05 setup 2 of 2 (refer to MODE 15 for further information)**

<table>
<thead>
<tr>
<th>Mode 16:</th>
<th>Y05-&gt;Working</th>
</tr>
</thead>
<tbody>
<tr>
<td>No-0; Yes-1</td>
<td></td>
</tr>
</tbody>
</table>

| Press "F0"->"O"."1" |

This parameter is only available when MODE 15 is set 1.

0 – Y05 is ON

- When a new bar stock arrives at TOP CUT position.

- After every feeding.

Signals sent under this condition are called CYCLE START signal.

1 – Y05 starts to be ON when a new bar stock arrives at TOP CUT position and OFF when the next loading cycle initiated.

Signal sent under this condition is called WORKING signal.
**MODE 17 : PLC output contacts Y04 and Y26 setup**

Define whether the output contacts Y04 and Y26 or not when there is no bar stock left in magazine.

0 – When the magazine is out of bar stock, the output will not contact Y26 “Lack bar” but an alarm message will activate by contacting Y04.

1 – When the magazine is out of bar stock, the output will contact Y26 “Lack bar” but Y04 will not be contacted for not activating an alarm message.

**MODE 18 : Front rest setup 2 of 3 (refer to MODE 24, 20)**

Define the second front rest device action BEFORE pusher arrives at it during AUTOMATIC mode.

0 – Acts according to chuck signal. The synchronization device open/close when chuck open/closed.

1 – Keep closed.

**MODE 19 : Bar change setup 2 of 3 (refer to MODE 7 and 12 for further information)**

For cases that the parts machining need multiple chuck opening, an addition check point should be proceed before the bar change cycle initiated.

0 – Chuck signal (A1) initiates the loading cycle.

1 – The pusher will be held for 5 seconds before next step proceeded:

- If the chuck is closed in 5 seconds, the next machining will be proceeded.
- If the chuck is not closed within 5 seconds, the pusher returns to its origin reference and proceeds bar change process.

This setup only validates when MODE 6 set 1.

**Note:** Before the bar change cycle initiated, MODE 12 or TORQUE STOP (A4) signal decides if pushing force applied on pusher.
MODE 20 : Anti-vibration device setup 1 of 3 (refer to MODE 24, 18)

Define how the first front rest action during bar change process.

0 – The front rest closes when the TOP CUT device activated by new bar stock (SQ1 + 200mm).

1 – The front rest closes when the bar feed system arrives at TOP CUT position and sends a START signal.

<table>
<thead>
<tr>
<th>MODE 20</th>
<th>sensor SQ1+200mm</th>
<th>TOP position</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>OPEN</td>
<td>CLOSED</td>
</tr>
</tbody>
</table>

Mode 20:
1st Front --- 0
---Rest Setup
No-0; Yes-1
Press "F0"->"0","1"

MODE 21 :

This parameter originally is left blank.

Mode 21:
Press "F0"->"0","1"

MODE 22 : Lathe type setup 3 of 3 (refer to MODE 21, 22 for related setup)

0 – For the lathes whose brand name are not “EASY”.
1 – For the lathes whose brand name are “EASY” only.

Mode 22:
Lathe is "EASY"
No-0; Yes-1
Press "F0"->"0","1"

MODE 23 : HMI display language setup

0 – Optional language

Mode 23:
Language

Press "F0"->Change
**MODE 24 : Anti-vibration device setup 3 of 3 (refer to MODE 24, 20)**

Define the front rest devices (both first and second one) action after the pusher passes through them.

0 – Keep open.

1 – Acts according to chuck signal (the front rest devices open/close when chuck is open/closed.)

### STD AV

<table>
<thead>
<tr>
<th>Close</th>
<th>Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODE 18</td>
<td>MODE 24</td>
</tr>
</tbody>
</table>

### OP AV

<table>
<thead>
<tr>
<th>0 : act according to chuck signal</th>
<th>0 : Keep open</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 : Keep open</td>
<td>1 : Synchronized with chuck</td>
</tr>
</tbody>
</table>

**P06 1st**

**P06 1st + 250mm**

**Mode 24:**

Front rest → Pusher

No-0; Yes-1

Press "F0"→"0","1"

---

**MODE 25 : INCHING setup**

The bar feeder system might struggle to position profiled (hex, square...) bar stocks or round ones without proper preparation to arrive at TOP CUT position cause they are not easy to enter lathe chuck.

The function INCHING consists 2 actions which help the bar stock to enter lathe chuck:

1) Move the pusher back and forth couple times.

2) Send continuous INCHING signal to the lathe as an external command to rotate the spindle. This signal is specially created for the lathes whose spindle is not rotatable when chuck is open.

This parameter defines if the pusher movement activated. The INCHING signal is not affected.

0 – Activate pusher movement.

1 – Deactivate pusher movement.

**Mode 25:**

Deactivate Inching

No-0; Yes-1

Press "F0"→"0","1"
### MODE 26: Bar insertion check setup

Define if the bar feed system activate the insertion check function. If this check is activated, the bar feed system proceeds 2 actions after insertion:

1) Move pusher 100mm forward. If the pusher cannot finish this action within 5 seconds, an alarm e26 arises.

2) Move the pusher 100 backward and clamp the material clamping device. If the bar stock is not existing, an alarm e04 arises.

0 – Deactivate this function.
1 – Activate this function.

| Mode 26: | 0 |
| Check Bar insert No-0; Yes-1 |
| Press "F0"->"0","1" |

### MODE 27: Pusher return speed setup

The bar feed system offers 2 speed options for the pusher returning strokes proceeded during bar change cycle below:

1) The pusher returns for reloading a new bar stock.

2) The short pusher returns after FIRST FEED finished.

0 – Low speed
1 – High speed

| Mode 27: | 0 |
| High Speed Retraction No-0; Yes-1 |
| Press "F0"->"0","1" |

### MODE 28: Torque stop signal (A4) logic setup 2 of 2

Define how the bar feed system process this signal.

0 – The bar feed system holds this signal right after receive it either the it’s continuous or a pulse until new bar stock arrives TOP CUT position

1 – The bar feed system read and apply the signal as how it sent from the lathe.

| Mode 28: | 0 |
| Torque stop not hold No-0; Yes-1 |
| Press "F0"->"0","1" |
**MODE 29 : Synchronization signal (A6, optional) setup 2 of 2 (refer to MODE 13 for related setup)**

Defines if the synchronization device (Y03) is activated or not. The following conditions must be fulfilled to allow is activation.

- Swiss type lathe
- MODE 13=1
- Chuck closed

0 - Synchronization signal (a6) is activated when the bar feeder in Synchro mode is.

1 - Synchronization signal (a6) is deactivated when the bar feeder in Synchro mode is.

Modify the following modes according to the lathe provided signals:

<table>
<thead>
<tr>
<th>conditions</th>
<th>Provided signal</th>
<th>Mode setup</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A2</td>
<td>A6</td>
</tr>
<tr>
<td>1</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>2</td>
<td>yes</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>No</td>
<td>yes</td>
</tr>
<tr>
<td>4</td>
<td>No</td>
<td>no</td>
</tr>
</tbody>
</table>

**MODE 30 : Lathe door sensor signal (A7, optional) logic setup**

Allows to control the pusher speed in manual mode when the lathe door is open.

0 – The lathe signal (A7) is activated when the door is open.

1 – The lathe signal (A7) is deactivated when the door is open.

If the lathe does not provides A7, MODE 30=0

**MODE 31 : Length check skip**

Define the number of check processes for the feeding length that will be skipped after a new bar stock was loaded. Possible values are 1 to 5.

**Mode 29:**  
A6-Sync signal  
NO-0; NC-1  
Press "F0"–>"0","1"  

**Mode 30:**  
A7-Door closed  
NO-0; NC-1  
Press "F0"–>"0","1"  

**Mode 31:**  
1 after loading new bar delay length check  
Press "F0"–>"1","5"
MODE 32
This parameter originally is left blank.

MODE 33: Unit selection
Switch the unit between metric and inch
0 – metric
1 – inch

MODE 34: No upper limit
The parameter is set to deactivate maximum acceptable bar stock feeding / pusher moving distance ("too long_dist" limitation on P07).
0 – The maximum value of P07 (too long distance) is limited to P02 (part length) + 50mm. P07 <= (P02 + 50)
1 – P07 (too long distance) has no limit. In some applications P07 must be set bigger than (P02 + 50).

MODE 35
This parameter originally is left blank.
This chapter lists all the error messages description and brief trouble shooting. The error messages aim to remind the operator that an abnormal situation probably exists or has happened. Whenever an error message activated, please follow the description and trouble shooting to check the problem. If necessary, contact LNS for technical support.

1. BAR FEED SYSTEM ERROR MESSAGES

1.1. Error message index

The table offers the sequences proceeded while both bar feed system and lathe are running under AUTOMATIC mode and timing of related alarm is activated. Please note the lathe AUTOMATIC sequence is simplified and only presents selected and necessary steps for the bar feed system.

<table>
<thead>
<tr>
<th>Step</th>
<th>Alarm index</th>
<th>Bar feed system action</th>
<th>Lathe action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fixed type</td>
</tr>
<tr>
<td>1</td>
<td>e22</td>
<td>Check chapter 9.1.2 for further information.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e18</td>
<td>If this step cannot be accomplished in 15 seconds and currently the chuck is open.</td>
<td>Pusher retracts to origin reference.</td>
</tr>
<tr>
<td></td>
<td>e10</td>
<td>If this step cannot be accomplished in 15 seconds and currently the chuck is close.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>e26</td>
<td>If the pusher cannot finish this step in 4 seconds.</td>
<td>After the pusher arrives at the origin reference, it moves forward according to P08 setup.</td>
</tr>
<tr>
<td>3</td>
<td>e06</td>
<td>If SQ4 cannot detect the material</td>
<td>The material clamping device clamps and detects the bar stock by sensor SQ4.</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>The material clamping device clamps and detects the bar stock by sensor SQ4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 8 | If:
  - SQ4 detects material, proceed to step 12.
  - SQ4 does not detect material, proceed to step 16. |
| 9 | **e05** If this step cannot be accomplished in 10 seconds. The pusher retracts backward until it arrives at origin reference (the SECOND retraction). |
| 10 | After the pusher retracts to origin reference, it moves forward according to P08 setup right away. |
| 11 | **e16** If SQ4 detects material. The material clamping device clamps the bar stock and detect it by sensor SQ4. |
| 12 | The pusher retracts backward until it arrives at origin reference. |
| 13 | **e15** If this step cannot be accomplished in 3 seconds. Channel open. |
| 14 | Both loading finger and bar length flap activates. |
| 15 | **e09** If the SQ1 sensor is not OFF before FIRST FEED started. The short pusher advances the material to FIRST FEED position. **e17** If this step cannot be accomplished in 15 seconds. |
| 16 | **e07** If SQ4 cannot detect material. Material clamping device clamps |
| 17 | **e18** If this step cannot be accomplished in 15 seconds. Short pusher returns to origin reference |
| 18 | **e14** If this step cannot be accomplished in 3 seconds. Channel close. |
| 19 | **e04** If this step cannot be accomplished in 4 seconds. Pusher charges forward and insert the material into finger chuck.
  If MODE 26=0, proceeds step 26.
  If MODE 26=1, proceeds step 24. |
<p>| 20 | <strong>e26</strong> If this step cannot be accomplished in 5 seconds. Pusher moves 100mm forward and returns. |
| 21 | <strong>e04</strong> If this step cannot be accomplished in 4 seconds. Material clamping device clamps and releases. |</p>
<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>If the chuck signal is OFF during TOP CUT. The pusher advances the material to TOP CUT position.</td>
</tr>
<tr>
<td>23</td>
<td>If the chuck is not closed in 30 seconds. After the pusher arrives at TOP CUT position, the bar feed system activates START signal.</td>
</tr>
<tr>
<td>24</td>
<td>Chuck close</td>
</tr>
<tr>
<td>25</td>
<td>TOP CUT</td>
</tr>
<tr>
<td>26</td>
<td>If the main access cover is open. Synchronization activated. Machining</td>
</tr>
<tr>
<td>27</td>
<td>Chuck open</td>
</tr>
<tr>
<td>28</td>
<td>Check BAR END signal. - If it’s activated, proceed to step 1. - If it’s not activated, proceed to step 30.</td>
</tr>
<tr>
<td>29</td>
<td>Pusher moves forwarded until it touch against the stopper and activates START signal. Disable Synchronization. The pusher holds its position right there.</td>
</tr>
<tr>
<td>30</td>
<td>If the pusher’s backward moving distance is larger than &lt;too short dist&gt; on P07. Spindle moves backward to part length.</td>
</tr>
<tr>
<td>31</td>
<td>Check chapter 9.1.2 for further information. Close chuck and proceed to step 28.</td>
</tr>
</tbody>
</table>

**Legend:**
- **Fixed type**
- **Swiss type**
- **Synchronization activated**
1.2. Error message description and trouble shooting guides.

When there is an error arose according to judgment of PLC, a corresponding error messages will be shown on the HMI display. Follow the trouble shooting procedures below for solving the problems and reset the bar feed system from the error by pressing the MANUAL mode key.

**e01 Emergency stop**

**Meaning**
The emergency stop circuit is open.

**Explanation**
The emergency stop circuit goes through:
- emergency stop button on electrical cabinet
- emergency stop button on remote control
- emergency stop circuit on lathe (optional)
- pneumatic pressure switch SP1
- circuit breaker QM1
- circuit breaker K1

During normal operation, this circuit offers continuous signal to PLC input contact X10. Whenever this circuit is open, the signal to PLC input contact X10 interrupted and actions below will be taken by sequence:

1. The 3 phases 220V AC to servo amplifier is interrupted.
2. All the output signals of PLC are interrupted except Y04 (input signal of relay R1).
3. The alarm e01 is arising at HMI.

Check the circuit step by step to locate the broke point. Reset the component or contact LNS for technical support.

**Trouble shooting**

1. Check if the emergency stop button on electrical cabinet was pressed. If it is, please release it. (refer to chapter 4, 2.2.1.)
2. Check if the emergency stop on remote control was pressed. If it is, please release it. (refer to chapter 8.1.2)
3. Check if the emergency stop circuit on the lathe is open. If it is, please reset it.
4. Check if the air pressure is too low (refer to chapter 5.3.4)
5. Check if the switch is broken.
6. Check if circuit protector QM1 is tripped. If it is, please reset it. (refer to chapter 4.4.2)
7. Check if contactor K1 is tripped. If it is, please reset it. (refer to chapter 4.4.2)
**e02 Main access cover is open**

**Meaning**
The main access cover is open while the bar feed system is in AUTOMATIC mode.

**Explanation**
The SQ8 is not energized. This alarm only available when the main access cover safety switch was installed.

**Trouble shooting**
- 1. Close the cover.
- 2. If the cover is closed:
  - 2.1. Check if there is something blocking the cover or the cover is bent therefore the sensor SQ8 is not energized.
  - 2.2. Check if the switch SQ8 is broken. If it is, please replace the switch or contact LNS for technical support.

**e03 Servo alarm**

**Meaning**
An alarm is activated at the servo amplifier.

**Trouble shooting**
Please open the electric cabinet. Check the error code shown on the servo amplifier (refer to chapter 4 to find the servo amplifier). Follow the trouble shooting guide on chapter 9.2 to solve the problem or contact LNS for technical support.

**e04 Failed on bar insertion**

**Meaning**
The material is failed to be inserted into finger chuck.

**Explanation**
Check step 19 of chapter 9.1.1 for further information.

**Trouble shooting**
- 1. Check if the finger chuck dimension fits the bar stock.
- 2. Check if the bar stock was pre-treated with proper bar preparation (please refer to chapter 7.11).

**e05 Bar cannot be extracted from finger chuck**

**Meaning**
The bar stock cannot be retracted.

**Explanation**
Check step 9 on chapter 9.1.1 for further information.

**Trouble shooting**
- 1. Check if the finger chuck dimension fits the bar stock.
- 2. Check if the bar stock was pre-treated with proper bar preparation (please refer to chapter 7.10).
**CHAPTER 9: TROUBLESHOOTING**

**e06 Bar not return to home**

**Meaning**
The remnant was not pulled back to the bar feed system.

**Explanation**
Check step 4 on chapter 9.1.1 for further information.

**Trouble shooting**
1. Check if the lathe chuck collect is too tight or there are burrs left on the remnant surface.
2. Check if the finger chuck size is too large for the bar stock.
3. Check if sensor SQ4 is broken.

**e07 No material on frame**

**Meaning**
The magazine is out of material.

**Explanation**
While the bar feed system is proceeding to FIRST FEED, sensor SQ4 is ON. Check step 16 on chapter 9.1.1 for further information.

**Trouble shooting**
1. Check if the magazine is out of bar stock and re-fill accordingly.
2. Check if the sensor SQ4 is broken.

**e08 NC alarm**

**Meaning**
An alarm is activated on the lathe.

**Explanation**
Relay A2 is energized by the interface signal.

**Trouble shooting**
Check the lathe alarm detail and follow the trouble shooting guide to solve it.
9-8 CHAPTER 9: TROUBLESHOOTING

**e09 Bar length measuring device not reset**

**Meaning**
The bar length measuring device is not ready.

**Explanation**
The bar length measuring sensor SQ1 is not ON (because the flap is not detected) before the bar feed system is proceeding FIRST FEED.

Check step 15 on chapter 9.1.1 for further information.

**Trouble shooting**
1. Check if the bar stock or other substance laid on the bar length measuring device.
2. Check if the bar length measuring flap is loosed.
3. Check if the bar length device cylinder is broken.
4. Check if the bar length sensor SQ1 is loosed or broken.

**e10 Lathe chuck is not open.**

**Meaning**
The lathe chuck is not open.

**Explanation**
This alarm is activated either:
- The chuck signal is ON while the pusher is advancing the new bar stock into spindle during bar change process.
- The pusher does not return to origin reference within 5 seconds while the BAR END signal is currently ON and the chuck signal is currently OFF.

Check step 2 and 22 on chapter 9.1.1 for further information.

**Trouble shooting**
1. Check if the chuck is currently open. If it is:
2. Check if the MODE 2 setup fits lathe signal logic.
3. Check if the interface function is adequate.

**e11 Bar feeder is not in auto mode**

**Meaning**
To remind the operator that the lathe is possibly in AUTOMATIC mode but the bar feed system is still in MANUAL mode.

**Explanation**
The bar feed system is in MANUAL mode when the lathe chuck signal is turned ON/OFF 3 cycles.

**Note:** The error is checking the chuck signal only. It’s not about if the lathe is in AUTOMATIC mode or not.

**Trouble shooting**
Switch the bar feed system into AUTOMATIC mode if it supposed to be.
Notice
Error messages 12, 13, 21 and 22, 23, 24 are related to each other. Refer to table below for cross reference.

<table>
<thead>
<tr>
<th>Too long</th>
<th>Fixed type lathe</th>
<th>Swiss type lathe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chuck open</td>
<td>e12</td>
<td>e23</td>
</tr>
<tr>
<td>Chuck closed</td>
<td>e21</td>
<td>e24</td>
</tr>
<tr>
<td>Too short</td>
<td>e13</td>
<td>e22</td>
</tr>
</tbody>
</table>

e12 Feeding too long – Fixed type lathe

Meaning
The feeding length while chuck is open is longer than <too long dist_> setup on P07.

Explanation
• The bar feed system continuously monitor pusher moving distance while chuck is open (the bar feed system is currently feeding bar stock). Once the distance is larger than <too long dist_> on parameter P07, this alarm will be activated instantly.
• Only available for fixed type lathe (MODE 10 is set 0).

Trouble shooting
1. Check if the bar stock is escaping from the chuck
2. Check if <too long dist_> setup on P07 is incorrect.
3. Check if the transmission mechanism is broken.
4. Check if the stopper position is incorrect.

Note: The number of check skipped will be proceed according to MODE 31 setup.

e13 Feeding too short - Fixed type lathe

Meaning
The feeding length while chuck is open is smaller than the <too short dist> setup on P07.

Explanation
• The bar feed system checks the pusher moving distance from chuck open to chuck close on the moment of chuck closing (the lathe is currently proceeding machining). If the distance is shorter than <too short dist> on parameter P07, this alarm will be activated instantly.
• Only available for fixed type lathe (MODE 10 is set 0).

Trouble shooting
1. Check if the alignment is correct.
2. Check if the channel, front tube size is correct and if blocked.
3. Check if the lathe spindle is blocked.
4. Check if the front rest is clamping.
5. Check if the chuck is too tight due to the size is incorrect or there are burrs inside the chuck.
6. Check if <too short dist> setup on P07 is incorrect.
7. Check if the timer for controlling the chuck open/close is too short.
8. Check if the stopper position is incorrect.
9. Check if BAR END setup is incorrect.
**e14 Guide channel cannot close**

**Meaning**
The guide channel cannot be closed.

**Explanation**
After channel in open position sensor SQ5 is OFF, the channel in closed position sensor SQ3 is not ON within 3 seconds.

**Trouble shooting**
1. Check if there is something blocked the guide channel.
2. Check if sensor SQ3 is broken.
3. Check if the air pressure is not high enough that the channel cover cylinder cannot be activated or the action time is too long.

**e15 Channel cannot open**

**Meaning**
The guide channel cannot open.

**Explanation**
After channel in closed position sensor SQ3 is OFF, the channel in open position sensor SQ5 is not ON within 3 seconds.

**Trouble shooting**
1. Check if there is something blocked the guide channel.
2. Check if sensor SQ5 is broken.
3. Check if the air pressure is not high enough that the channel cover cylinder cannot be activated or the action time is too long.

**e16 Remnant not fall**

**Meaning**
The remnant did not fall into the remnant box.

**Explanation**
Sensor SQ4 detects material after the second retraction. Refer to step 11 on chapter 9.1.1 for further information.

**Trouble shooting**
1. Check if the finger chuck dimension fits the bar stock.
2. Check if the bar stock was pre-treated with proper bar preparation (please refer to chapter 7.10).
3. Check if the remnant is full.
4. Check if the material clamping device blades are worn out or broken.
5. Check if the air pressure is too low.
e17 Bar stock cannot be positioned

**Meaning**
The FIRST FEED or general part feeding cannot be accomplished.

**Explanation**
1. During FIRST FEED process, the short pusher cannot arrive at <1st feed dist> setup on parameter P08 with 15 seconds after it leaves origin reference.
2. During general feeding process, the pusher cannot feed the bar stock to part length according <Part length> setup on P02 parameter within 20 seconds.

Check step 15 and 26 on chapter 9.1.1 for further information.

**Trouble shooting**
1. Check if the alignment is correct.
2. Check if the channel, front tube size is correct and if blocked.
3. Check if the lathe spindle is blocked.
4. Check if the front rest is clamping.
5. Check if the chuck is too tight due to the size is incorrect or there are burrs inside the chuck.
6. Check if <part length> setup on P02 is incorrect.
7. Check if the stopper position is incorrect.

---

**e18 M1 reverse overtime**

**Meaning**
The pusher cannot return to origin reference.

**Explanation**
1. After the short pusher accomplished FIRST FEED, if it cannot return to origin reference within 15 seconds, this alarm will be activated.
2. When the chuck opens while BAR END signal is currently ON, the pusher must return to origin reference. If the pusher cannot accomplish it within 15 seconds, this alarm will be activated.

Check step 2 and 17 on chapter 9.1.1 for further information.

**Trouble shooting**
1. Check if the channel or lathe spindle blocked.
2. Check if the transmission mechanism is broken.
3. Check if the origin reference sensor SQ2 is broken.
9-12 CHAPTER 9: TROUBLESHOOTING

e19 Cannot forward bar stock into lathe spindle

Meaning
The pusher cannot advances the bar stock to TOP CUT.

Explanation
• \( \text{MODE 25} = 0 \)
  The pusher must accomplish TOP CUT within 180 seconds.
• \( \text{MODE 25} = 1 \)
  The pusher must accomplish TOP CUT within 30 seconds.

Trouble shooting
1. Check if the alignment is correct.
2. Check if the channel, front tube size is correct and if blocked.
3. Check if the front rest is clamping.
4. Check if the lathe spindle is blocked.
5. Check if the chuck is too tight due to the size is incorrect or there are burrs inside the chuck.
6. Check if <TOP CUT> setup on P05 is incorrect.
7. Check if the stopper position is incorrect.

e20 The lathe cannot be started

Meaning
The lathe cannot be started.

Explanation
After the bar feed system activates START signal for 30 seconds, the chuck is still open.

Trouble shooting
1. Check if the lathe receives START signal from the bar feed system.
2. Check if the bar feed system receives CHUCK signal.
3. Check if the interface cable connection status is functioning.
**e21 Pusher moves – Fixed type lathe**

**Meaning**
The pusher moving distance while chuck is closed is larger than the `<too long dist_ * >` setup on P07.

**Explanation**
- The bar feed system continuously monitor pusher moving distance while chuck is closed (the lathe is currently proceeding machining). Once the distance is larger than `<too long dist_ * >` on parameter P07, this alarm will be activated instantly.
- Only available for fixed type lathe (MODE 10 is set 0).

**Trouble shooting**
1. Check if the bar stock is escaping from the chuck
2. Check if `<too long dist_ * >` setup on P07 is incorrect.
3. Check if the transmission mechanism is broken.
4. Check if the chuck is broken or the pressure setup is incorrect.

---

**e22 Feeding too short - Swiss type lathe**

**Meaning**
The feeding distance while chuck is closed is shorter than the `<too short dist_ * >` setup on P07.

**Explanation**
- The bar feed system checks pusher moving distance from chuck close to chuck open on the moment of chuck opening. If the distance is shorter than `<too short>` on parameter P07, this alarm will be activated instantly.
- Only available for Swiss type lathe (MODE 10 is set 1).

**Note:** The number of check skipped will be proceed according to MODE 31 setup.

**Trouble shooting**
1. Check if the alignment is correct.
2. Check if the chuck is too tight due to the size is incorrect or there are burrs inside the chuck.
3. Check if `<too short dist_ * >` setup on P07 is incorrect.
4. Check if BAR END setup is incorrect.
5. Check if the synchronization device works correctly (if it’s equipped and activated).
**e23 Pusher moves – Swiss type lathe**

**Meaning**
The pusher moving distance while chuck is open is larger than the <too long dist_ #> setup on P07.

**Explanation**
- The bar feed system continuously monitor pusher moving distance while chuck is open (the lathe spindle is moving backward for proceeding feeding movement). Once the distance is longer than <too long dist_ #> on parameter P07, this alarm will be activated instantly.
- Only available for Swiss type lathe (MODE 10 is set 1).

**Trouble shooting**
1. Check if the bar stock is escaping from the chuck
2. Check if <too long dist_ #> setup on P07 is incorrect.
3. Check if the transmission mechanism is broken.
4. Check if the stopper position is incorrect or the cut off tool is broken (if the operator is using the cut off tool as stopper).

---

**e24 Feeding too long – Swiss type lathe**

**Meaning**
The feeding distance while chuck is closed is larger than the <too long dist_ * > setup on P07.

**Explanation**
The bar feed system continuously monitor pusher moving distance while chuck is closed (the lathe is currently proceeding machining). Once the distance is longer than <too long dist_ * > on parameter P07, this alarm will be activated instantly.

Only available for Swiss type lathe (MODE 10 is set 1).

**Trouble shooting**
1. Check if the bar stock is escaping from the chuck
2. Check if <too long dist_ * > setup on P07 is incorrect.
3. Check if the transmission mechanism is broken.
4. Check if the chuck is broken or the pressure setup is incorrect.
**e25 TOP CUT distance is too small**

**Meaning**
TOP CUT setup is smaller than the value measured by bar feed system.

**Explanation**
- The bar stock accesses TOP CUT position during FIRST FEED.
- During FIRST FEED, the bar stock cannot touch bar length sensor before the value of `<FIRST FEED> - <TOP CUT>`.

**Example:** If the FIRST FEED value is 1470 and TOP CUT value is 1200. The bar stock cannot touch bar length sensor before 270.

**Trouble shooting**
1. Check both `<TOP CUT>` setup on P05 parameter and `<1st feed dist>` on P08 parameter.
2. Check if the bar length flap drops itself before the bar stock touches it.

**e26 Insertion / extraction failed**

**Meaning**
The material cannot be inserted into or extracted from finger chuck.

**Explanation**
Check step 3 and 20 on chapter 9.1.1 for further information.

**Trouble shooting**
1. Check if the finger chuck dimension fits the bar stock.
2. Check if the bar stock was pre-treated with proper bar preparation (please refer to chapter 7.10).
3. Check if the finger chuck is broken.

**e27 TOP CUT setup or stopper position is incorrect**

**Meaning**
The TOP CUT position setup or the stopper position is incorrect.

**Explanation**
The pusher is not stopped within 50mm beyond the TOP CUT position. (only available when MODE 8 = 0)

**Trouble shooting**
1. Check `<TOP CUT>` setup on parameter P05.
2. Check the stopper position.
e28 Hydraulic pump is not running

**Meaning**
The hydraulic pump is not running while the lathe is machining.

**Explanation**
- Hydraulic pressure is not detected for 60 seconds.
- The timer activates whenever the hydraulic pressure is missing and the alarm is activated after next chuck open.
- This alarm is only available when the hydraulic pressure gauge is equipped (refer to chapter 6.).

**Trouble shooting**
1. Check if <2nd> setup on P06 parameter is correct.
2. Check if the hydraulic oil is enough.
3. Check if the hydraulic pump suction is blocked.
4. Check if the motor is broken.

---

E29 Dry Run error

**Signification**
The barfeeder contracted an error in Dry Run mode

**Explanation**
- During the barfeeder movement an error occurred.

**Trouble shooting**
- Check the actual pusher movement

---

E30 Dry Run error

**Signification**
The barfeeder is in Dry Run mode

**Explanation**
- Impossible movement, barfeeder in Dry Run mode

**Trouble shooting**
- Skip the barfeeder in automatic or manual mode.
## 2. SERVO AMPLIFIER ERROR MESSAGES

### ALE01 : Overcurrent

<table>
<thead>
<tr>
<th>Description</th>
<th>Main circuit current is higher than 1.5 multiple of motor’s instantaneous maximum current value.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing Method</td>
<td>Turn ARST (DI signal) ON to clear the fault or restart the servo drive.</td>
</tr>
<tr>
<td>Potential Cause</td>
<td>Checking Method</td>
</tr>
<tr>
<td>1. Short-circuit at drive output. (U, V, W)</td>
<td>1. Check the wiring connections between drive and motor. 2. Check if the wire is short-circuited.</td>
</tr>
<tr>
<td>2. Motor wiring error.</td>
<td>Check if the wiring steps are all correct when connecting motor to drive.</td>
</tr>
<tr>
<td>3. IGBT error.</td>
<td>Heat sink overheated.</td>
</tr>
<tr>
<td>4. Control parameter setting error.</td>
<td>Check if the setting value exceeds the factory default setting.</td>
</tr>
<tr>
<td>5. Control command setting error.</td>
<td>Check if the control input command is unstable (too much fluctuation).</td>
</tr>
</tbody>
</table>

### ALE02 : Overvoltage

<table>
<thead>
<tr>
<th>Description</th>
<th>Main circuit voltage has exceeded its maximum allowable value.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing Method</td>
<td>This fault message can be removed automatically after the voltage has returned within its specification.</td>
</tr>
<tr>
<td>Potential Cause</td>
<td>Checking Method</td>
</tr>
<tr>
<td>1. The main circuit voltage has exceeded its maximum allowable value.</td>
<td>Use voltmeter to check whether the input voltage falls within the rated input voltage.</td>
</tr>
<tr>
<td>2. Input power error. (Incorrect power input)</td>
<td>Use voltmeter to check whether the input voltage is within the specified limit.</td>
</tr>
</tbody>
</table>

### ALE03 : Undervoltage

<table>
<thead>
<tr>
<th>Description</th>
<th>Main circuit voltage is below its minimum specified value.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing Method</td>
<td>Turn ARST (DI signal) ON to clear the fault or restart the servo drive.</td>
</tr>
<tr>
<td>Potential Cause</td>
<td>Checking Method</td>
</tr>
<tr>
<td>1. The main circuit voltage is below its minimum specified value.</td>
<td>Check whether the wiring of main circuit input voltage is normal.</td>
</tr>
<tr>
<td>2. No input voltage at main circuit.</td>
<td>Use voltmeter to check whether input voltage at main circuit is normal.</td>
</tr>
<tr>
<td>3. Input power error. (Incorrect power input)</td>
<td>Use voltmeter to check whether the input voltage is within the specified limit.</td>
</tr>
</tbody>
</table>
### ALE04: Motor overheated

**Description:** The motor’s operating temperature is higher than the upper-limit of the specification.

**Clearing Method:** Turn ARST (DI signal) ON to clear the fault or restart the servo drive.

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Servo system is overloaded.</td>
<td>1. Use thermometer to check the motor temperature. 2. Check if servo system is overloaded.</td>
<td>Estimate the capacity of motor and drive again.</td>
</tr>
</tbody>
</table>

### ALE05: Regeneration error

**Description:** Regeneration control operation is in error.

**Clearing Method:** Turn ARST (DI signal) ON to clear the fault or restart the servo drive.

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regenerative resistor is not connected.</td>
<td>Check the wiring connection of regenerative resistor.</td>
<td>Reconnect regenerative resistor.</td>
</tr>
<tr>
<td>Regenerative switch transistor fault.</td>
<td>Check if regenerative switch transistor is short circuited.</td>
<td>Please contact your distributor for assistance or contact with Delta.</td>
</tr>
<tr>
<td>Parameter setting is in error.</td>
<td>Confirm the parameter setting and specifications of regenerative resistor.</td>
<td>Correctly reset parameter again.</td>
</tr>
</tbody>
</table>

### ALE06: Overload

**Description:** Servo motor and drive is overload.

**Clearing Method:** Turn ARST (DI signal) ON to clear the fault or restart the servo drive.

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>The drive has exceeded its rated load during continuous operation.</td>
<td>Check if the drive is overloaded.</td>
<td>Increase motor capacity or reduce load.</td>
</tr>
<tr>
<td>Control system parameter setting is incorrect.</td>
<td>Check if there is mechanical vibration  Accel / Decel time setting is too fast.</td>
<td>Adjust gain value of control circuit. Decrease Accel / Decel time setting.</td>
</tr>
<tr>
<td>The wiring of drive and encoder is in error.</td>
<td>Check the wiring of U, V, W and encoder.</td>
<td>Ensure all wiring is correct.</td>
</tr>
</tbody>
</table>

### ALE07: Overspeed

**Description:** Motor’s control speed exceeds the limit of normal speed.

**Clearing Method:** Turn ARST (DI signal) ON to clear the fault or restart the servo drive.

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed input command is not stable (too much fluctuation).</td>
<td>Use signal detector to detect if input signal is abnormal.</td>
<td>Ensure that input command frequency is stable (not fluctuate too much) and activate filter function (P1-06, P1-07 and P1-08).</td>
</tr>
<tr>
<td>Over-speed parameter setting is defective.</td>
<td>Check if over-speed parameter setting value is too low.</td>
<td>Correctly set over-speed parameter setting (P2-34).</td>
</tr>
</tbody>
</table>
**ALE08 : Abnormal pulse control command**

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pulse command frequency is higher than rated input frequency.</td>
<td>Use pulse frequency detector to measure input frequency.</td>
<td>Correctly set the input pulse frequency.</td>
</tr>
</tbody>
</table>

**ALE09 : Excessive deviation**

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Maximum deviation parameter setting is too small.</td>
<td>Check the maximum deviation parameter setting and observe the position error value when the motor is running.</td>
<td>Increases the parameter setting value of P2-35.</td>
</tr>
<tr>
<td>2. Gain value is too small.</td>
<td>Check for proper gain value.</td>
<td>Correctly adjust gain value.</td>
</tr>
<tr>
<td>3. Torque limit is too low.</td>
<td>Check torque limit value.</td>
<td>Correctly adjust torque limit value.</td>
</tr>
<tr>
<td>4. There is an overload.</td>
<td>Check for overload condition.</td>
<td>Reduce external applied load or reestimate the motor capacity.</td>
</tr>
</tbody>
</table>

**ALE10 : Watch dog execution time out**

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Watch dog execution error.</td>
<td>Check and reset the power supply.</td>
<td>If there are any abnormal conditions after resetting the power supply, please contact your distributor for assistance or contact with Delta.</td>
</tr>
</tbody>
</table>

**ALE11 : Encoder error (Position detector fault)**

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The wiring of encoder is in error.</td>
<td>1. Check if all wiring is correct. 2. Check if the users conduct the wiring by the wiring information in the user manual.</td>
<td>Ensure all wiring is correct.</td>
</tr>
<tr>
<td>2. Encoder is loose.</td>
<td>Examine the encoder connector.</td>
<td>Install the motor again.</td>
</tr>
<tr>
<td>3. The wiring of encoder is defective.</td>
<td>Check if all connections are tight.</td>
<td>Conduct the wiring again.</td>
</tr>
<tr>
<td>4. Encoder is damage.</td>
<td>Check the encoder for the damage.</td>
<td>Repair or replace the motor.</td>
</tr>
</tbody>
</table>
### ALE12 : Adjustment error

**Description**
Adjusted value exceeds the limit of its allowable setting value when perform electrical adjustment.

**Clearing Method**
This fault message can be removed after the wiring of CN1 connector (I/O signal connector) is removed and auto adjustment function is executed.

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The setting value of drift adjustment has exceeded its maximum allowable value.</td>
<td>1. Remove CN1 wiring. 2. Execute the drift adjustment again. (Set P2-08 to 20 first, and then set P4-10 to 5.)</td>
<td>If the error does not clear after executing the drift adjustment again, please contact your distributor for assistance or contact with Delta.</td>
</tr>
</tbody>
</table>

### ALE13 : Emergency stop activated

**Description**
Emergency stop switch is activated.

**Clearing Method**
This fault message can be removed automatically by turning off EMGS (DI signal).

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Emergency stop switch is activated.</td>
<td>Check if emergency stop switch is On or Off.</td>
<td>Activate emergency stop switch.</td>
</tr>
</tbody>
</table>

### ALE14 : Reverse (CWL) limit switch error

**Description**
Reverse limit switch is activated.

**Clearing Method**
Turn ARST (DI signal) ON to clear the fault or restart the servo drive.

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reverse limit switch is activated.</td>
<td>Check if reverse limit switch is On or Off.</td>
<td>Activate reverse limit switch.</td>
</tr>
<tr>
<td>2. Servo system is not stable.</td>
<td>Check the value of control parameter setting and load inertia.</td>
<td>Modify parameter setting and reestimate motor capacity.</td>
</tr>
</tbody>
</table>

### ALE15 : Forward (CCWL) limit switch error

**Description**
Forward limit switch is activated.

**Clearing Method**
Turn ARST (DI signal) ON to clear the fault or restart the servo drive.

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Forward limit switch is activated.</td>
<td>Check if forward limit switch is On or Off.</td>
<td>Activate forward limit switch.</td>
</tr>
<tr>
<td>2. Servo system is not stable.</td>
<td>Check the value of control parameter setting and load inertia.</td>
<td>Modify parameter setting and reestimate motor capacity.</td>
</tr>
</tbody>
</table>

### ALE16 : IGBT temperature error

**Description**
The temperature of IGBT is over high.

**Clearing Method**
Turn ARST (DI signal) ON to clear the fault or restart the servo drive.

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The drive has exceeded its rated load during continuous operation.</td>
<td>Check if there is overload or the motor current is too high.</td>
<td>Increase motor capacity or reduce load.</td>
</tr>
<tr>
<td>2. Short-circuit at drive output.</td>
<td>Check the drive input wiring.</td>
<td>Ensure all wiring is correct.</td>
</tr>
</tbody>
</table>
### ALE17: Memory error

**Description**
EE-PROM write-in and read-out is in error.

**Clearing Method**
Turn ARST (DI signal) ON to clear the fault or restart the servo drive.

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data error in Memory read-out / write-in</td>
<td>Reset parameter or power supply.</td>
<td>If the error does not clear after resetting the power supply, please contact your distributor for assistance or contact with Delta.</td>
</tr>
</tbody>
</table>

### ALE18: DSP communication error

**Description**
DSP communication is in error.

**Clearing Method**
Turn ARST (DI signal) ON to clear the fault or restart the servo drive.

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control power is in error.</td>
<td>Check and reset control power.</td>
<td>If the error does not clear after resetting the power supply, please contact your distributor for assistance or contact with Delta.</td>
</tr>
</tbody>
</table>

### ALE19: Serial communication error

**Description**
RS232/485 communication is in error.

**Clearing Method**
Turn ARST (DI signal) ON to clear the fault. This fault message can also be removed automatically after the communication is normal.

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication parameter setting is defective</td>
<td>Check the communication parameter setting.</td>
<td>Correctly set parameter setting.</td>
</tr>
<tr>
<td>Communication address is incorrect.</td>
<td>Check the communication address.</td>
<td>Correctly set communication address.</td>
</tr>
<tr>
<td>Communication value is incorrect.</td>
<td>Check the communication value.</td>
<td>Correctly set communication value.</td>
</tr>
</tbody>
</table>

### ALE20: Serial communication time out

**Description**
RS232/485 communication time out.

**Clearing Method**
Turn ARST (DI signal) ON to clear the fault or restart the servo drive.

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting value in time out parameter is not correct.</td>
<td>Check communication time out parameter setting.</td>
<td>Correctly set P3-07.</td>
</tr>
<tr>
<td>Not receiving communication command for a long time</td>
<td>Check whether communication cable is loose or broken.</td>
<td>Tighten the communication cable, make sure the communication cable is not damaged and ensure all wiring is correct.</td>
</tr>
</tbody>
</table>

### ALE21: Command write-in error

**Description**
Control command write-in error.

**Clearing Method**
Turn ARST (DI signal) ON to clear the fault or restart the servo drive.

<table>
<thead>
<tr>
<th>Potential Cause</th>
<th>Checking Method</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control power is in error.</td>
<td>Check and reset control power.</td>
<td>If the error does not clear after resetting the power supply, please contact your distributor for assistance or contact with Delta.</td>
</tr>
</tbody>
</table>
### ALE22 : Input power phase loss

<table>
<thead>
<tr>
<th>Description</th>
<th>One phase of the input power is lost.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clearing Method</strong></td>
<td>Turn ARST (DI signal) ON to clear the fault. This fault message can be removed automatically after input power phase lost problem is solved.</td>
</tr>
<tr>
<td><strong>Potential Cause</strong></td>
<td>Control power supply is in error.</td>
</tr>
<tr>
<td><strong>Checking Method</strong></td>
<td>Check the power cable and connections of R, S, T. Check whether the power cable is loose or the possible loss of phase on input power.</td>
</tr>
<tr>
<td><strong>Corrective Actions</strong></td>
<td>If the fault does not clear even when the three-phase power is connected correctly, please contact your distributor for assistance or contact with Delta.</td>
</tr>
</tbody>
</table>

### ALE23 : Pre-overload warning

<table>
<thead>
<tr>
<th>Description</th>
<th>To warn that the servo motor and drive is going to overload. This alarm will display before ALM06. When the servo motor reach the setting value of P1-56, the motor will send a warning to the drive. After the drive has detected the warning, the DO signal OLW will be activated and this fault message will display.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clearing Method</strong></td>
<td>Turn ARST (DI signal) ON to clear the fault or restart the servo drive.</td>
</tr>
<tr>
<td><strong>Potential Cause</strong></td>
<td>The drive is going to overload.</td>
</tr>
<tr>
<td><strong>Checking Method</strong></td>
<td>1. Check the load condition of the servo motor and drive. 2. Check the setting value of P1-56. Check whether the setting value of P1-56 is too small.</td>
</tr>
<tr>
<td><strong>Corrective Actions</strong></td>
<td>1. Please refer to the correction actions of ALE06. 2. Increase the setting value of P1-56 or set P1-56 to 100 and above.</td>
</tr>
</tbody>
</table>
3. FACTORS AFFECTING PERFORMANCE

3.1. 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.

3.2. 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.

3.3. 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. Please contact your LNS SA dealer for further information.
3.4. 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.
3.5. Clamping method

3.5.1. 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 360 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
3.5.2. 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 centers 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 centers of the jaws to obtain 2 times 6 support clamping points at 60 degrees.
4. MAINTENANCE

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

4.1. 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.

4.2. 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).

4.3. 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
It is possible that after a certain amount of use, the drive needs to be tightened.
To tighten the drive, refer to Chapter 7 / General Description.

4.4. 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. 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.
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... CLEAR TURRET
N...

PART PROGRAM

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

> (RETURN TO MAIN PROGRAM)

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

LNS AGENCIES

SCHWEIZ / SUISSE
LNS S.A.
Rte de Frinvillier
CH - 2534 ORVIN

Tel: +41 (0)32 358 02 00
Fax: +41 (0)32 358 02 01

FRANCE
LNS France
44, Impasse des Troènes
74800 Amancy

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
Barnsley S73 0BB

Tel: +44 1226 27 00 33
Fax: +44 1226 27 00 44

ITALIA
LNS Automazione srl
Via Mons. Colombo 34
21053 Castellanza – VA

Tel: +39 0 331 501 901
Fax: +39 0 331 482 101

TÜRKİYE
LNS Makine San.Tic.A.Ş.Via Mons. Colombo 34
Keresteciler San.Sit. 10,Sk.No:45
Kazan - Ankara / TÜRKİYE

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LNS AGENTS

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