AUTOMATIC BAR FEEDER

ATTACHMENTS LIST
MANUAL FOR USE AND MAINTENANCE
KEYBOARD INSTRUCTION MANUAL
SPARE PARTS BOOK
SCHEMATICS
EC CONFORMITY DECLARATION FOR MACHINE

SMART 320 Tp

EN **MANUAL FOR USE AND MAINTENANCE**

Rel. 1 **Date** 21/04/2008 **Cod.** 401005430

S/N

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TYPE OF DOCUMENT:	**MANUAL FOR USE AND MAINTENANCE**
PRODUCT:	**AUTOMATIC BAR FEEDER**
MODEL:	**SMART 320 Tp**

IEMCA S.p.A.
Via Granarolo, 167
Tel. 0546/698000 - Fax. 0546/46224
TLX 550879

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The operations described in the paragraphs that are preceded by this symbol must be performed only by qualified and skilled personnel with specific abilities and precise technical competence.
Any other operation can be performed either by qualified personnel and/or by professional bar feeder operators.

Before carrying out any operation on the bar feeder, it is of the utmost importance to read this manual carefully.

1.1 WARRANTY CONDITIONS

The applicable warranty period is subordinated to a correct assembly and coupling of the bar feeder to the lathe. In particular, prior to the first start-up, accurately make sure that the bar feeder is correctly aligned with the lathe and fixed with the expansion plugs as shown in chapter 4.

The product warranty is valid only if the bar feeder is installed by an authorized technician with Original Installation Certificate.
Please ask the technician, who will make the installation, to show the certificate, in order to ascertain the quality of the technical operations being carried out.
The warranty shall begin from the date on the “Installation Certificate” duly filled in and signed.
The document must be sent by mail to:
TECHNICAL SERVICE DEPARTMENT
IEMCA division of IGMI spa
48018 Faenza (Ra) ITALY - Via Granarolo, 167


IEMCA CERTIFICATO DI INSTALLAZIONE N° 0517 /02

Installazione e training eseguito da:

Ditta		Data	
Tecnico installatore		N° Rapporto di intervento	

Presso:

Cliente		Partecipanti
Nazione		
Caricatore		
Matricola		
Macc./Tipo		

ARGOMENTO

- Descrizione generale del caricatore e del suo funzionamento, spiegazione del ciclo di lavoro.
- Istruzioni per attrezzare il caricatore e come eseguire il cambio di lavorazione. Descrizione e cambio di: guide, springbarra, pinze, semitoccole, carrello anteriore e di riduzione.
- Spiegazione tastiera operatore. Spiegazione dei parametri e loro utilizzo.
- Procedure di programmazione in base al tipo di lavorazione da eseguire.
- Errori - Cause - Rimedi; spiegazione dei principali allarmi riportati sui manuali.
- Presa visione della manualistica e delle indicazioni di manutenzione preventiva. Modalità per contattare l'assistenza tecnica autorizzata IEMCA.

Presa visione della manualistica e delle indicazioni di manutenzione preventiva. Modalità per contattare l'assistenza tecnica autorizzata IEMCA.

Gli argomenti contrassegnati sono stati trattati in modo completo ed esaustivo. I partecipanti si dichiarano completamente soddisfatti del Training effettuato.
Firma a lato per accettazione.

NOTA - l'erogazione del periodo di garanzia è subordinata a:
- installazione eseguita da un tecnico autorizzato IEMCA
- svolgimento del suindicato "training"

Timbro e firma del cliente

La decorrenza della garanzia si intende valida per 12 mesi dalla data di installazione e comunque, non oltre i 18 mesi dalla data di consegna.
La validità della garanzia entra in vigore dalla data di sottoscrizione incondizionata del presente modulo che dovrà essere restituito alla IEMCA, completo di ogni sua parte via posta entro 15 giorni, o tramite l'tecnico installatore.

IGMI

1.2 PURPOSE OF THE MANUAL

This manual has been written and supplied by the manufacturer, the information herein contained has been written in Italian (manufacturer's language) to be translated to other languages, in order to comply with legal and/or commercial requirements. This manual is integral part of the bar feeder equipment.

The compliance with the instructions herein ensures the operator and bar feeder safety as well as economy of operation and longer life of the bar feeder itself.

The important parts of this manual have been highlighted in bold type and are preceded by the following symbols:

DANGER - WARNING:

indicates impending danger which might cause serious injuries; exert the maximum caution.

WARNING – CAUTION:

indicates that it is necessary to adopt suitable behaviours so as to avoid accidents or damages to property.

INFORMATION:

these are technical instructions of particular importance.

For a quick search of the topics, see the table of contents.
This manual, which contains all the instructions for the bar feeder operation and maintenance, is supplied with: the "Keyboard instruction manual".
The "Keyboard instruction manual" contains all the instructions on how to use the installed software.

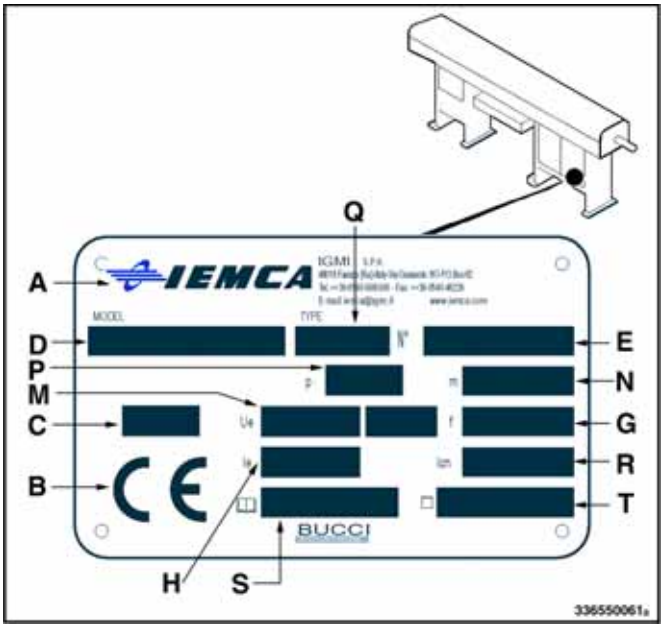
INFORMATION:

The data included in this publication are only given as an example.

IEMCA can apply changes in the model described in this publication at any time for any technical or business reason. Contact IEMCA service department for further information.

1.3 MANUFACTURER AND BAR FEEDER IDENTIFICATION

A Manufacturer identification.
B EC mark of conformity.
C Year of manufacture.
D Bar feeder model.
E Serial number.
G Mains frequency.
H Power consumption.
M Supply voltage.
N Bar feeder weight.
P Pneumatic system pressure.
Q Bar feeder and bar pusher length.
R Interrupting power.
S Base Wiring Diagram Number.
T Interface Wiring Diagram Number.



INFORMATION:

always provide the manufacturer with the above mentioned specifications when requesting information or ordering spare parts, etc.

1.4 ASSISTANCE REQUEST

Whenever necessary, please apply to one of the centres shown in the "LIST OF THE CUSTOMER SERVICE CENTRES".

INFORMATION:

when requesting technical assistance for the bar feeder, always specify the data shown on the identification plate.

1.5 ATTACHMENT LIST

- Spare parts catalogue
- Keyboard instruction manual
- Interface wiring diagram
- CD:
  Depliant
  Spare parts catalogue
  Instruction manual
  Operation and maintenance manual
  Base wiring diagram
  List of customer service centres

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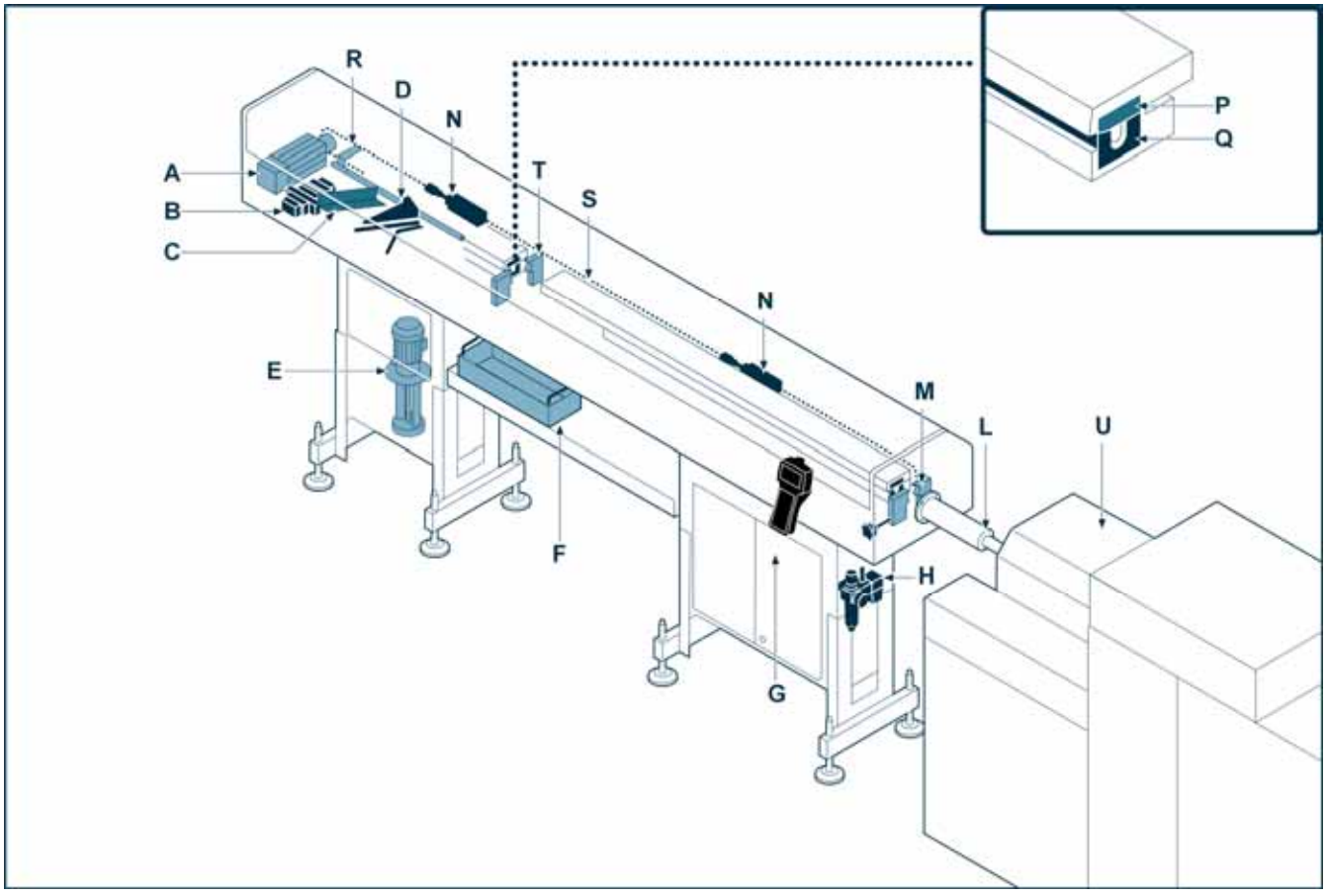
2.1 BAR FEEDER GENERAL DESCRIPTION

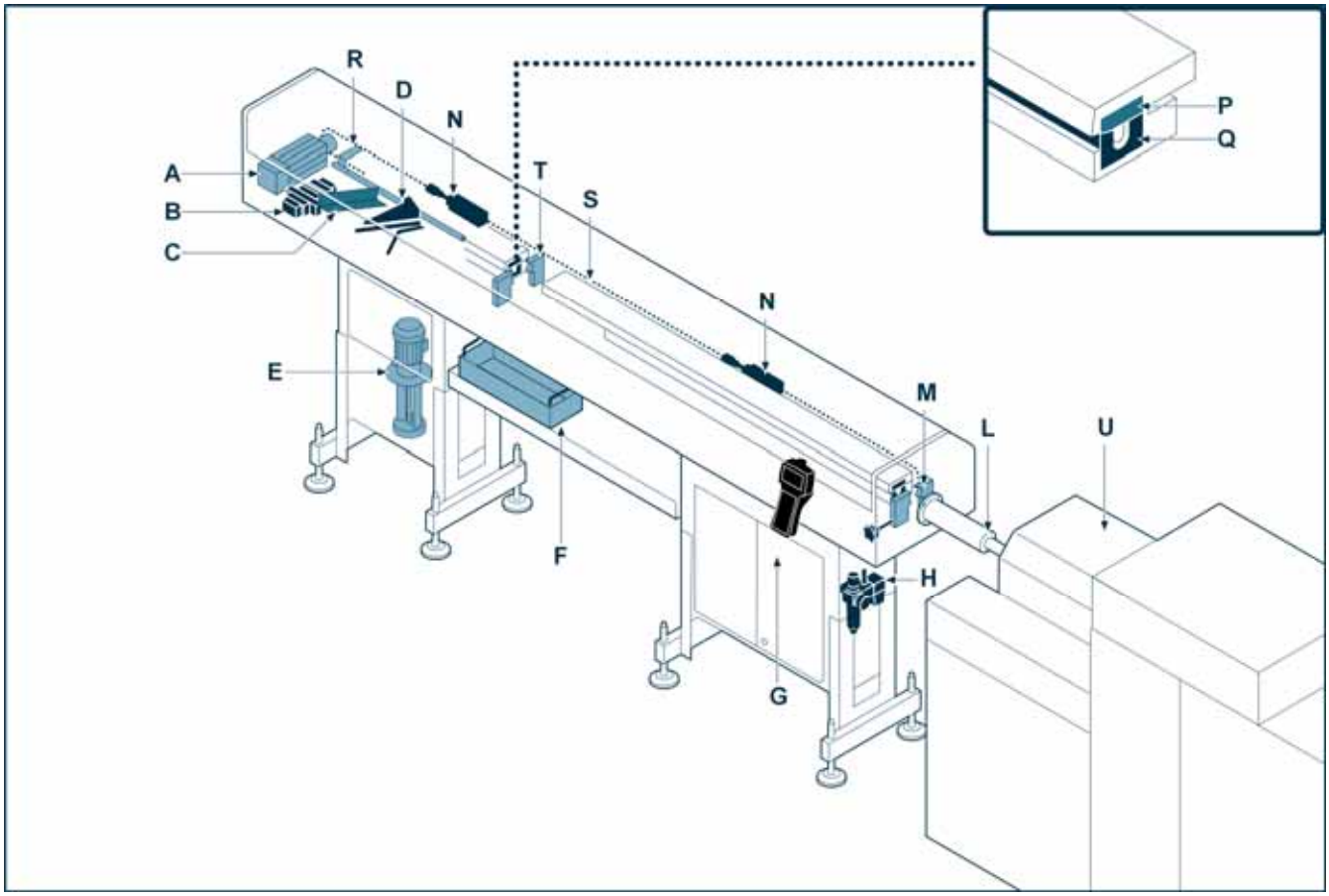
The SMART automatic bar feeder is used in the machine-tool industry and in particular, for automatic lathe feeding. It is particularly suitable for feeding fixed or sliding headstock lathes, numerical control or cam lathes.
The operating cycle is controlled by a PLC, integrated in the electrical control panel, which is able to communicate with the lathe control system. The bar feeder can be used to feed bars, pipes, various sections and metallic as well as polymeric materials.
Do not use flammable materials.
The guide channel is completely closed during machining; a pump is provided to maintain a continuous oil flow inside the guide channel, creating a hydrodynamic support effect; these features allow the bar to rotate at high r.p.m., with no vibrations and no surface damaging.
Thanks to the use of a "BRUSHLESS" and electronically controlled motor, the bar speed, torque value and feeding position may be determined at any time during the working cycle.
The bar remnant ejection can be performed by the bar pusher feeding or next bar feeding.
The SMART bar feeders are available in the following models:
SMART 320 (standard version)
SMART 320r (reversed version)
The texts, tables and illustrations contained in this manual concern, unless otherwise stated, the standard version (SMART 320) having the lathe on the operator's right.



- **MAIN PARTS**

A MOTOR; moves the bar pusher.

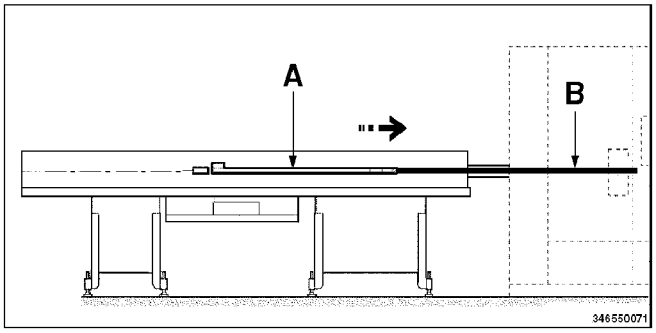
B SOLENOID VALVE UNIT; sends signals to the pneumatic components.
C BAR POSITIONING DEVICE; allows finding the bar aligning position on the magazine rack.
D MAGAZINE; stores the bars.
E LUBRICATION PUMP; delivers oil to the guide channels.
F REMNANT RECOVERY BOX; bar remnants are dropped into this box after extraction from the bar pusher collet.
G KEYBOARD; it allows bar feeder programming and function actuation.
H PRESSURE REGULATOR; to adjust the pressure of the pneumatic devices.
L TELESCOPIC NOSE; allows bar guidance between the bar feeder and the headstock.
M HALF-BUSHING DEVICE, holds the bar centred.
N PNEUMATIC CYLINDER FOR GUIDE CHANNEL OPENING/CLOSING; provides motion to the pneumatic devices to allow opening/closing the guide channels.
P UPPER GUIDE CHANNELS; drive the bar during the machining.



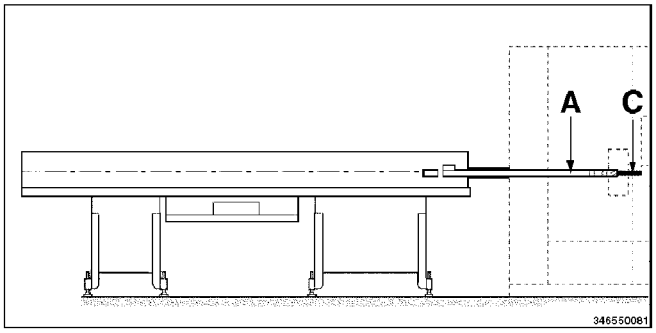
Q LOWER GUIDE CHANNELS; drive the bar during the machining.
R BAR PUSHER; pushes the bar during the machining.
S FEEDING CHAIN; transmits the motion from the motor to the bar pusher.
T CLAMPS; hold the bar during the loading and removal from the collet of the bar pusher.
U LATHE.

2.2 OPERATING CYCLE

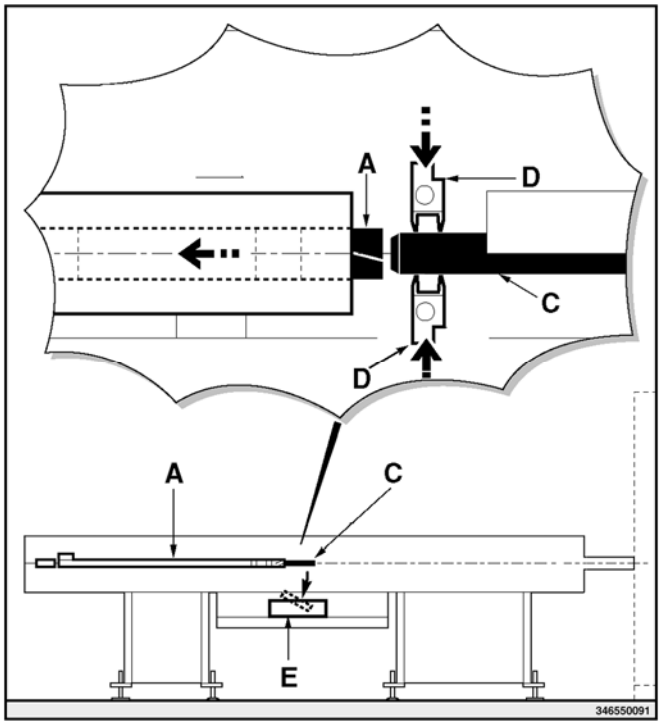
In the automatic operation mode, bar feeder movements are controlled in the sequence described below:
The bar pusher (A) feeds bar (B) in the lathe, by following lathe pulses, until bar end.



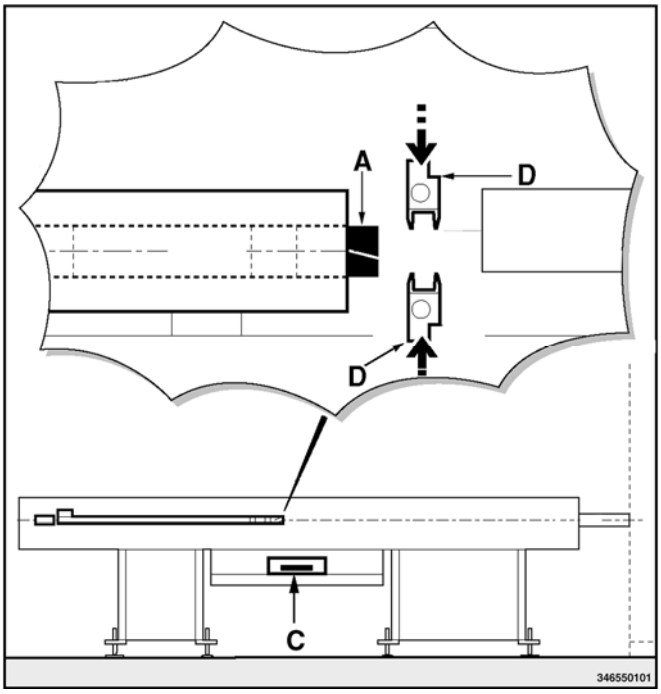
The bar pusher (A) and remnant (C) are in their forwards limit stop position.



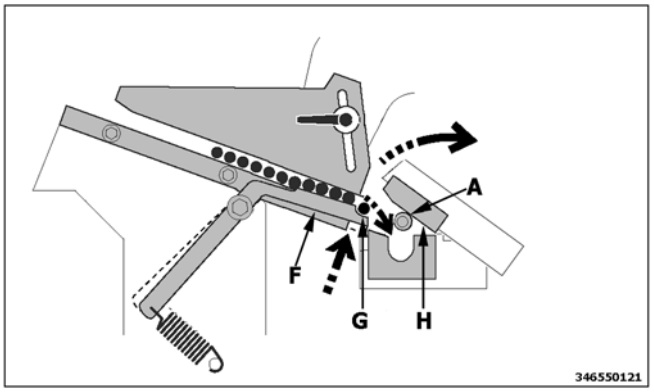
The bar pusher (A) and remnant (C) reach their backwards limit stop position.
The clamps (D) close and the bar pusher moves back; the remnant is extracted from the collet.
The clamps open and the remnant is dropped into the box (E).



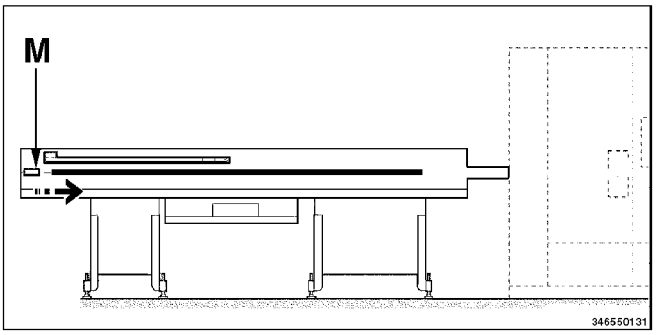
Clamps (D) close again to perform remnant (C) extraction check.
If the remnant is still inserted in the bar pusher collet, the bar feeder stops; otherwise, it continues its cycle.



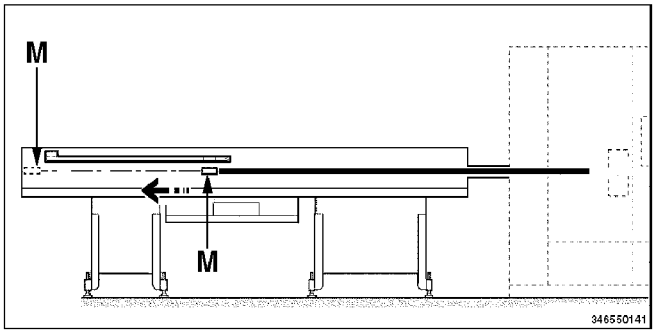
Upper guides (H) open together with bar pusher (A); the bar selection device (F) moves upwards thus raising the first bar and withholding the remaining bars. Bar (G) is dropped into the guide channel.
Bar selection device (F) is lowered.



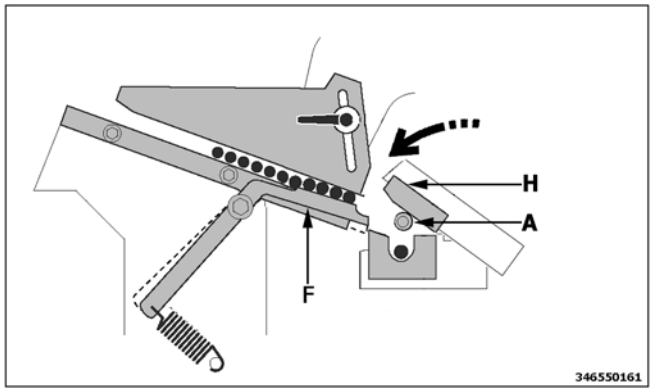
The first feeding carriage (M) starts its stroke.



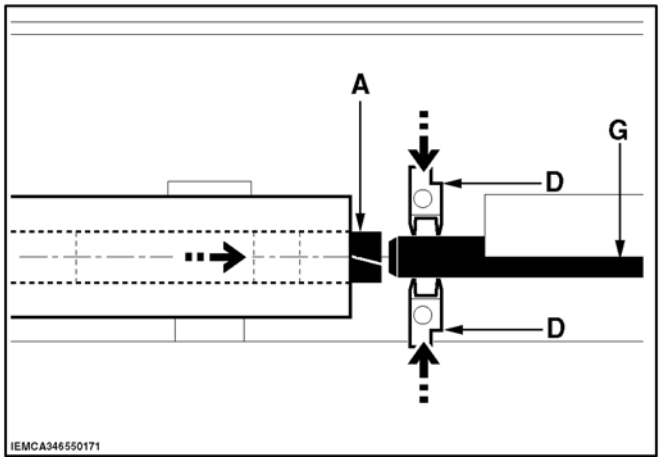
When the first feeding carriage (M) completes its stroke, the required space has been created for bar pusher insertion.
The first feeding carriage performs the return stroke.



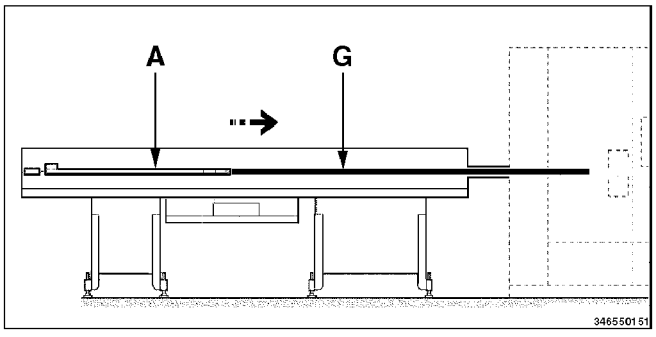
The upper guides (H) are closed; the bar-pusher (A) is positioned along the spindle axis. The bar selection device (F) is lowered allowing the bars to rest on the upper guide holder.



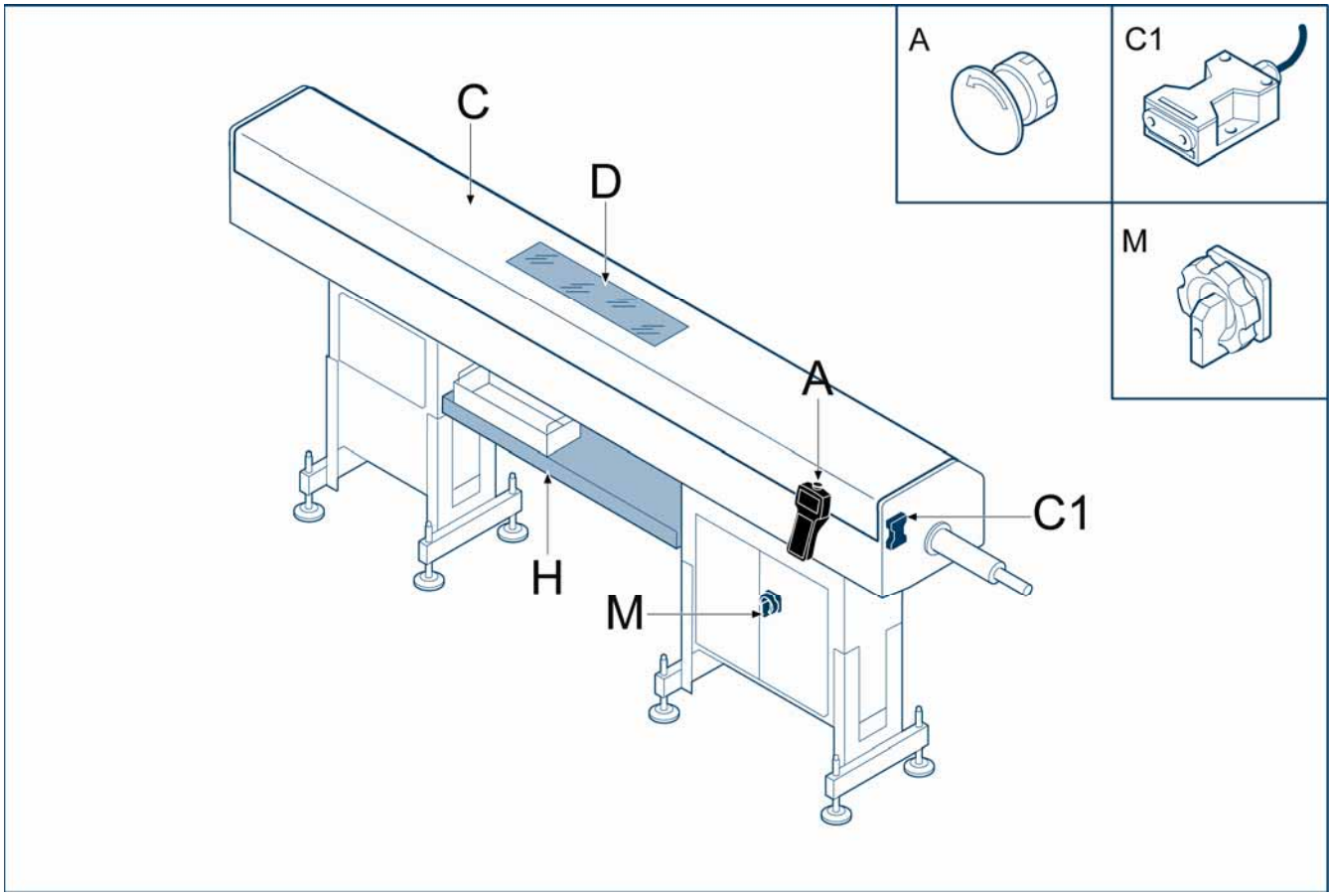
The clamps (D) close, the bar pusher (A) moves forwards; the bar (G) is inserted into the bar pusher collet.



The bar pusher (A) and bar (G) perform their facing stroke. A new automatic working cycle is started.



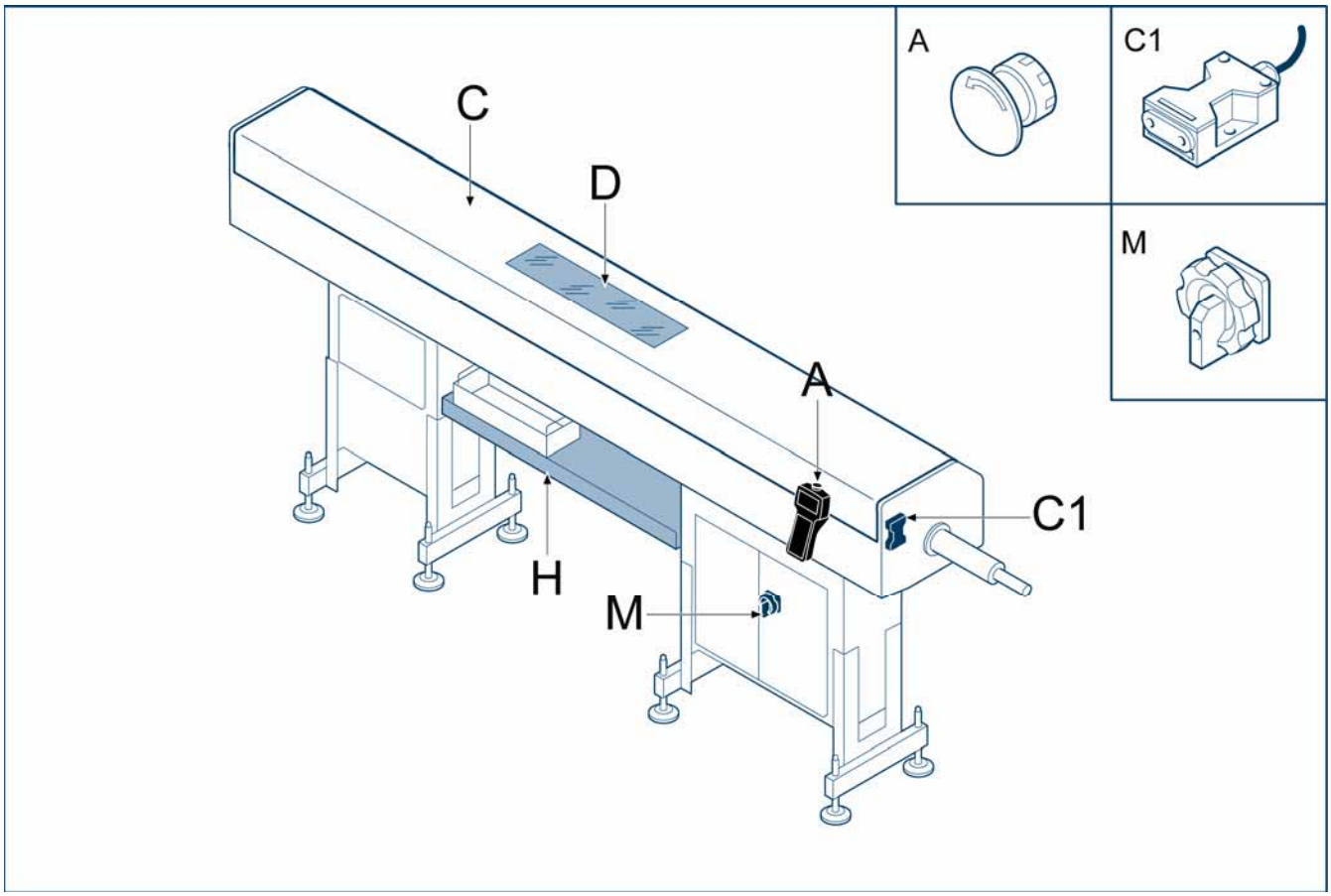
2.3 SAFETY DEVICES



A EMERGENCY BUTTON; when pressed, all bar feeder and lathe functions are stopped in an emergency condition.

C INTERLOCKED SLIDING GUARD: linked to microswitch C1.
according to the cycle setting, its functions are:
manual cycle;

- when the guard is opened, the feeder will be stopped if the guide channels are not closed.
- when the guard is opened, if the guide channels are closed, the feeder functions are not disabled because no risks for the operator are present.
- automatic cycle;
- during the bar feeding phase guard opening may be necessary for the purpose of restocking the magazine. Even if the feeder functions are not disabled, there are no operator hazards present inside the area.
- during the bar change procedure, the feeder will stop when the guard is opened. The guard closing allows the user to start the cycle again.

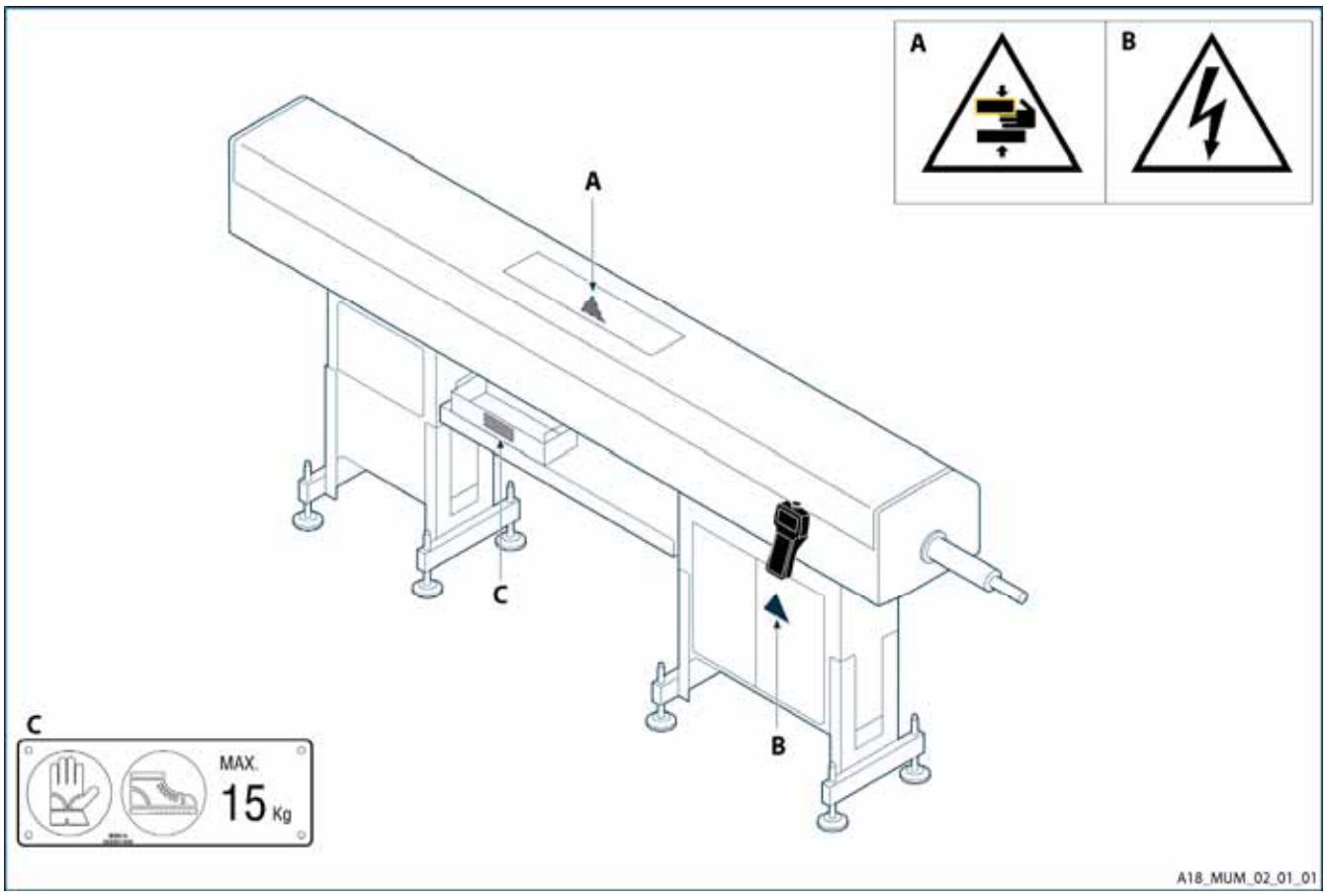


D FIXED GUARD: is made of transparent material to allow visual inspection of the bar magazine area.

H REMNANT RECOVERY BOX: it also acts as a fixed guard to prevent accidental access to moving parts.

M MAIN SWITCH: disconnects the electric power supply during the operations in the electrical control panel and during the bar feeder inactivity periods.

2.4 SAFETY PLATES - LOCATION AND DESCRIPTION



A Crushing danger of the upper limbs.
B Warning; danger of electric contact.
C Wear safety gloves and shoes.

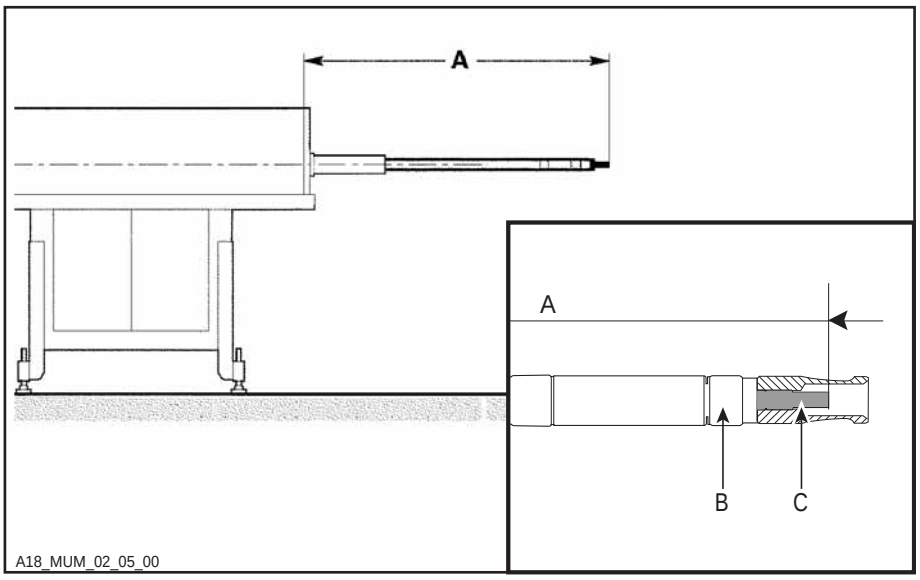
2.5 VERSION DESCRIPTION

Maximum and minimum bar length

Model	Version	Maximum length mm (ft)	Minimum length mm (ft)
SMART 320	32	3260 (10,7)	1500 (4,9)
	40	4060 (13,3)	1500 (4,9)

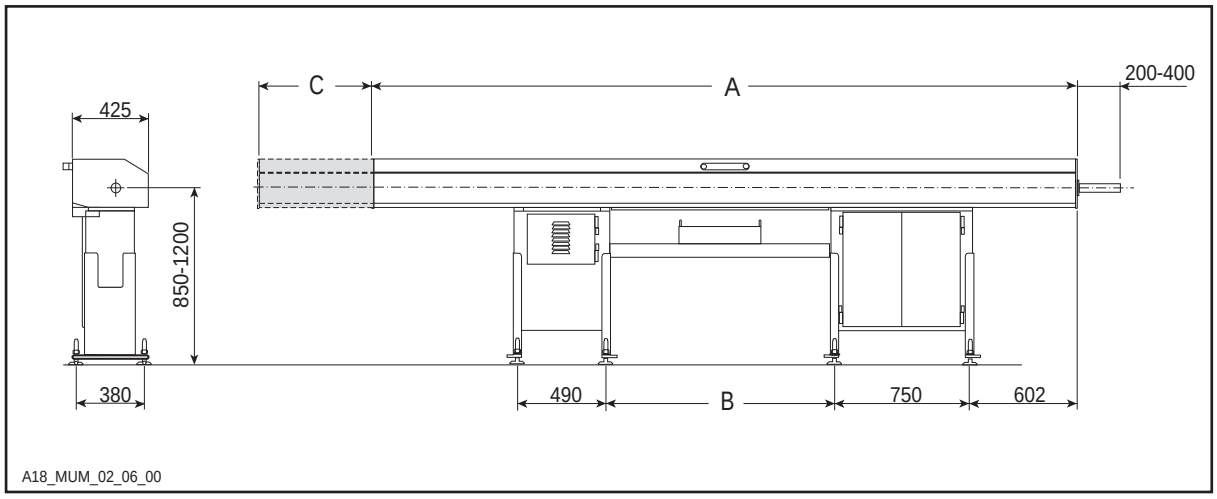
Maximum bar pusher extension

Model	Version	Version	A – Maximum extension (mm)
SMART 320	32 - 40	L	1030
		LL	1430



B - Revolving tip
C - Nipple

2.6 TECHNICAL DATA



Overall dimensions

Model	Version	A (mm)	B (mm)	C (mm)
SMART 320	32	3960	1275	800
	40	4760	1795	800

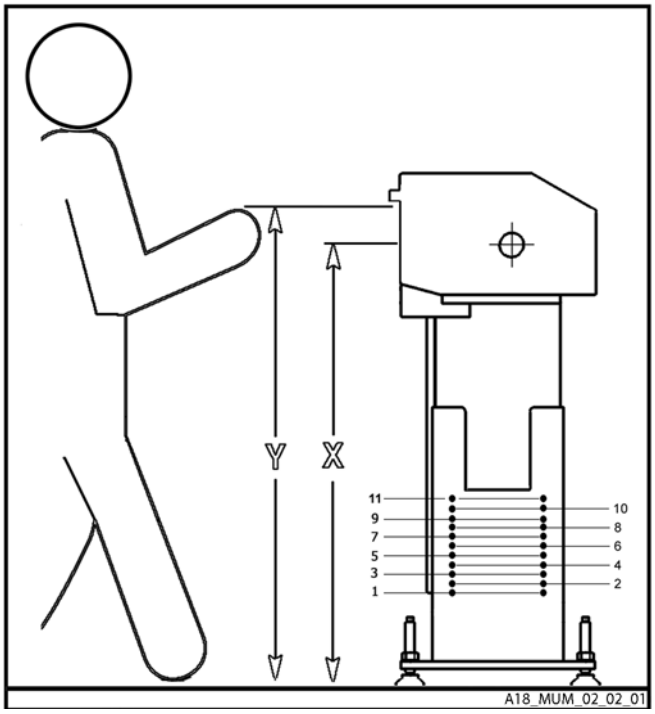
General technical data

	SMART 320	
Round bar size	Ø min 3 mm (1/8”)	Ø max 20 mm (51/64”)
Hexagonal bar size (key socket)	min 3 mm (1/8”)	max 17 mm (43/64”)
Minimum bar length	1500 mm	
Maximum bar length	Mod. 32 - 3260 Mod. 40 - 4060	
Magazine capacity (working width)	no. 18 bars Ø 10 mm (3/8”)	
Maximum bar load	Mod. 32 - 9 Kg Mod. 40 - 11 Kg	
Feeding speed (adjustable)	1000 mm/sec.	
Return speed (adjustable)	max 1500 mm/sec.	
Remnant length (standard version)	min 80 mm max 400 mm	
Bar change time (with 3,000 mm bar) Version 32	35 sec.	
Power supply voltage	230/400 Volt	
Mains frequency	50 Hz/ 60 Hz	
Control voltage	24 Volt D.C.	
Installed power	1.6 kW	
Oil quantity	40 l	
Maximum air supply pressure	8 bar	
Minimum air supply pressure	6 bar	
Pneumatic energy average consumption (**)	3 NL/min	
Dry weight	Mod. 32 – 480 Kg. Mod. 40 – 560 Kg.	

(**) Approximate value depending on the number of activation cycles

Working axis height

Model	Upper screws position	X (mm) Working axis height	Y (mm) Max loading height
SMART 320	**1**	835÷875	980
	2	870÷910	1020
	3	905÷945	1060
	4	940÷980	1100
	5	975÷1015	1140
	6	1010÷1050	1180
	7	1045÷1085	1220
	8	1080÷1120	1260
	9	1115÷1155	1300
	10	1150÷1190	1340
	11	1185÷1235	1380



SMART320 guide channel lubricating oils.

ISO/UNI rating	Brand	Name
CLASSE C CKB 32	Agip	Acer 32
	Api	Api Cis 32
	BP	Energol CS 32
	Castrol	Magna 32
	Chevron	Circulating Oil 32
	Elf	Movixa 32
	Esso	Nuto 32
	Fina	Solna 32
	IP	IP Hermea 32
	Klüber	Crucolan 32
	Mobil	Vectra Oil Light
	Olio FIAT	Daphne LPN 32
	Roloil	Arm V 32
	Shell	Vitrea 32 Tellus C 32
	Tamoil	Industrial Oil 32
	Texaco	Omnis 32
	Total	Cortis 32
		Azolla ZS 32
	Q8	Verdi 32

Oil quantity: 40 litres.

2.6.1 Noise levels

The bar feeder does not cause acoustic noise.
The noise occurs when the lathe, to which the bar feeder is connected, is working and the bar is rotating into the bar feeder guide channels.
In this case, the noise level depends on the following conditions:

- perfect alignment and levelling of the lathe-bar feeder unit;
- proper fixing to the floor both of the lathe and bar feeder;
- suitable bar gripping device fitted on lathe;
- use of a guide channel and a bar pusher with suitable dimensions as regards to the bar diameter;
- use of a front guide bush of suitable diameter (if supplied);
- use of bars with a straightness within the set limits (maximum deflection in mm equal to 0.5 ‰ of the bar length);
- use of a spindle liner having the same diameter as the bar feeder guide channel diameter;
- spindle rotation speed suitable for the material to be machined;
- as to the bar feeder, use of oil having features suitable for the diameter of the bar to be machined;
- all bar feeder guards must be closed.

Should the above mentioned conditions be met, the noise level emitted during the bar rotation into the guide channel, measured in compliance with the international standards, will be within the following limits:

- brass and steel round bars within 80 * dB(A);
- hexagonal steel bars within 83 dB(A);
- brass hexagonal bars within 85 dB(A);

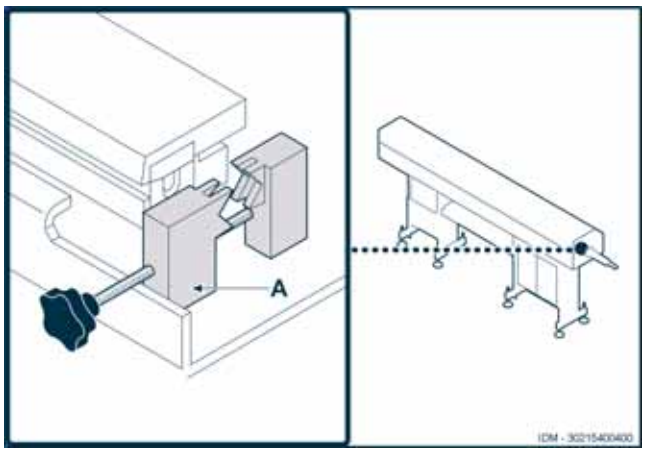
The noise level depends on the working conditions of the lathe to which the bar feeder is applied as well as on the bar type.
Whenever necessary, operators must wear PPE (personal protective equipment) in accordance with the regulations in force in the country in which the machine is installed.

- *) Measurements taken on round bar Ø14mm, guide channel Ø17mm, bar straightness < 5% at 3,750 Rpm, on a Star-RNC16 lathe serial number 086316.

2.7 ACCESSORIES - FOREWORD

To improve the feeder performance and increase its versatility, the following optional device is available:

2.7.1 Anti-vibration device - Description



It is attached to the front part of the bar feeder. Its function its to reduce bar vibrations to a minimum, by keeping the bar centred during rotation thanks to two half bushes (A).
In many cases, this device can be used (by simply adjusting the diameter of the half bushes) to greatly extend the range of diameters which can be machined without having to replace the guide channel.
This device is not recommended for hexagonal bar machining.

Operation

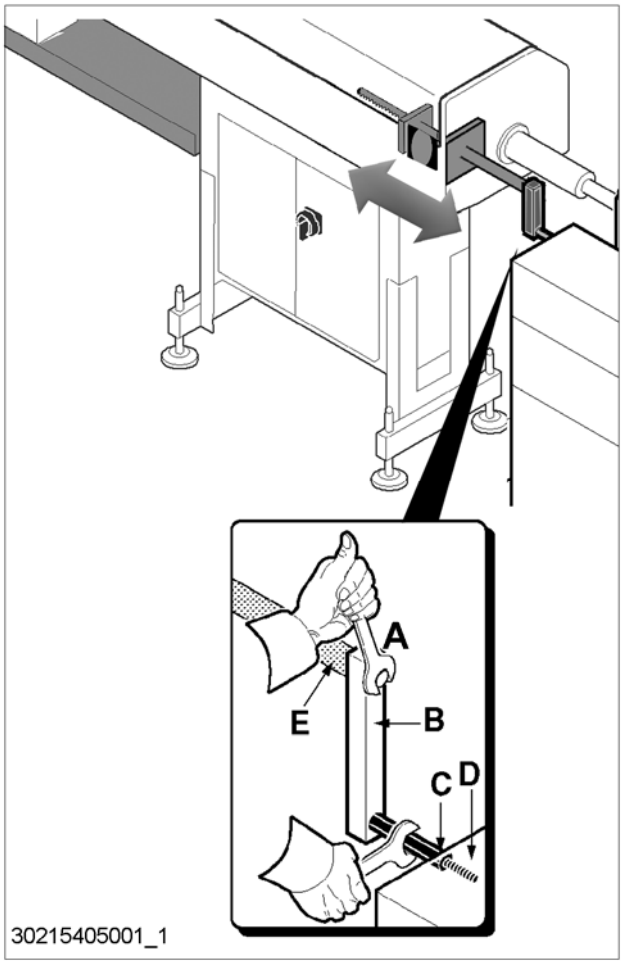
- When the bar is dropped into the guide channel, the two half-bushes are open.
- The closing phase is controlled by a pneumatic cylinder when the bar feeder has completed the bar loading cycle. The oil flow for the machined bar lubrication and support starts together with the closing phase.
- When the bar pusher approaches the device, the half-bushes open up to allow its passage; the oil flow then stops.

2.8 DEVICE FOR SLIDING HEADSTOCK LATHES - FOREWORD

This feeder has been designed and manufactured to be coupled to sliding headstock lathes too. To do this, special devices are available which are listed and then described below.

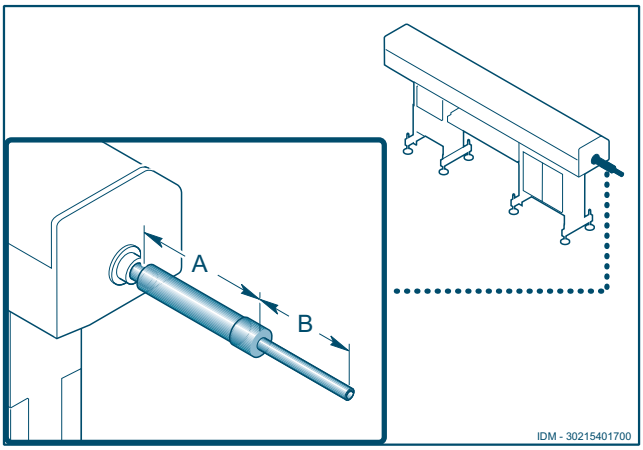
2.8.1 Bar/headstock synchronizing device - Description

It is used to connect the bar-pusher (and consequently, the bar) to the lathe headstock, to obtain their synchronized forwards/backwards movement.



2.8.2 Telescopic nose - Description

It is used to optimize bar guiding between the bush holder device and the lathe spindle.



Maximum stroke and overall dimension

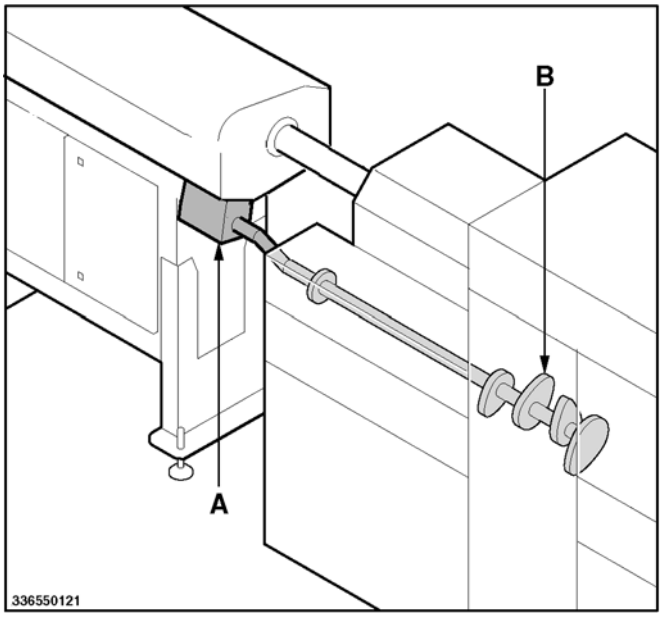
Model	Maximum stroke A (mm)	Overall dimensions B (mm)
SMART 320	120	230
	160	320
	170	200
	220	260
	320	310

2.9 DEVICES FOR CAM LATHES - FOREWORD

This feeder has been designed and manufactured to be coupled to cam lathes too. To do this, special devices are available which are listed and then described below.

2.9.1 Cam box - Description

Used to synchronize the feeder and cam lathe movements. The cams located in the box (A) are connected to the lathe camshaft (B).

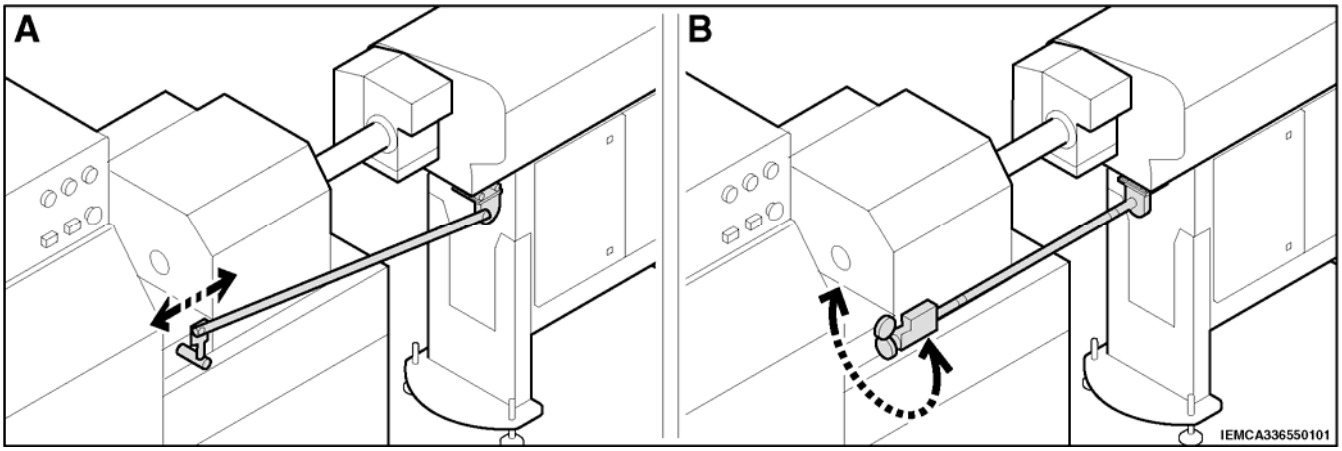


2.9.2 Camshaft release device - Description

Used to release and engage the camshaft during bar changeover. A radial version and an axial version of this device are available.

A Radial version

B Axial version



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3.1 GENERAL SAFETY REGULATIONS

It is of the utmost importance to read this manual carefully before installing, using, servicing the bar feeder or performing any other work on it. The constant compliance with the instructions in this manual ensures the operator safety.

- The user and expert operator must perform the specified duties only.
- Do not tamper with the safety devices for any reason whatsoever.
- Comply strictly with the health and safety regulations at work issued by the relevant authorities in each country.
- IEMCA declines any liability whatsoever for injury to persons or damage to property if the relevant safety regulations are disregarded.

3.2 HANDLING AND INSTALLATION - Safety

- The bar feeder must be handled using suitable means and methods only.
- People must not stand or transit underneath a suspended load, or within the range of action of the crane, lift truck or other suitable lifting and transport means.
- The bar machining and loading area must be delimited to prevent collisions between the operator and the means of transport or handling of the material to be machined or of other kinds.
- Correct positioning of the bar feeder, lighting and cleanliness of the working environment are of the utmost importance as far as personal safety is concerned.
- The connection to the electric installation must be carried out by skilled personnel only.
- Make sure that the electrical installation is connected to an efficient earthing system by means of an appropriate cable.

3.3 ADJUSTMENTS AND SETUP - Safety

- Carry out the adjustments as described in the operation manual.
- Do not change the working parameters to obtain performances other than those envisaged in the design and testing phases.
- Do not adjust the bar feeder when running unless expressly requested in the manual.
- Do not feed the machine with bars having dimensions other than those recommended by the manufacturer.
- Do not use flexible pipes as handholds.

3.4 USE AND OPERATION - Safety

- The working area around the bar feeder must always be kept clean and uncluttered so as to allow performing the bar loading phase without encountering obstacles or dangers, and to allow immediate access to the emergency devices.

It should also be kept clean and free from oil materials that may make the surface slippery thus creating a dangerous condition for the operator.

- Perform the starting sequence of the working cycle as recommended.
- Do not put hands or anything else near or inside the moving parts or parts in tension.
- Remove bracelets, watches, rings and ties.
- If necessary, use strong work gloves with five fingers, which do not reduce the grip sensitivity or power.
- Wear work shoes as well as personal protection devices provided for by the safety regulations in force in all countries.
- Inform the maintenance personnel of any operating anomalies.
- Before starting the bar feeder, make sure that there is no personnel engaged in servicing or cleaning the machine.

3.5 BAR FEEDER MAINTENANCE - Safety

- Do not allow unauthorized personnel to carry out maintenance operations.
- Read this manual carefully before carrying out maintenance operations.
- Do not lubricate, repair or adjust the bar feeder while running, unless expressly indicated in the manual.
- Stop the bar feeder in accordance with the foreseen procedures before carrying out the lubrication or other operations.
- Do use matches, lighters or torches as lightning means during operations with inflammable fluids.
- Keep drain oil in suitable containers and deliver it to companies specialized in the storage and disposal of polluting waste products.
- Avoid environmental pollution.
- Use original IEMCA spare parts only.

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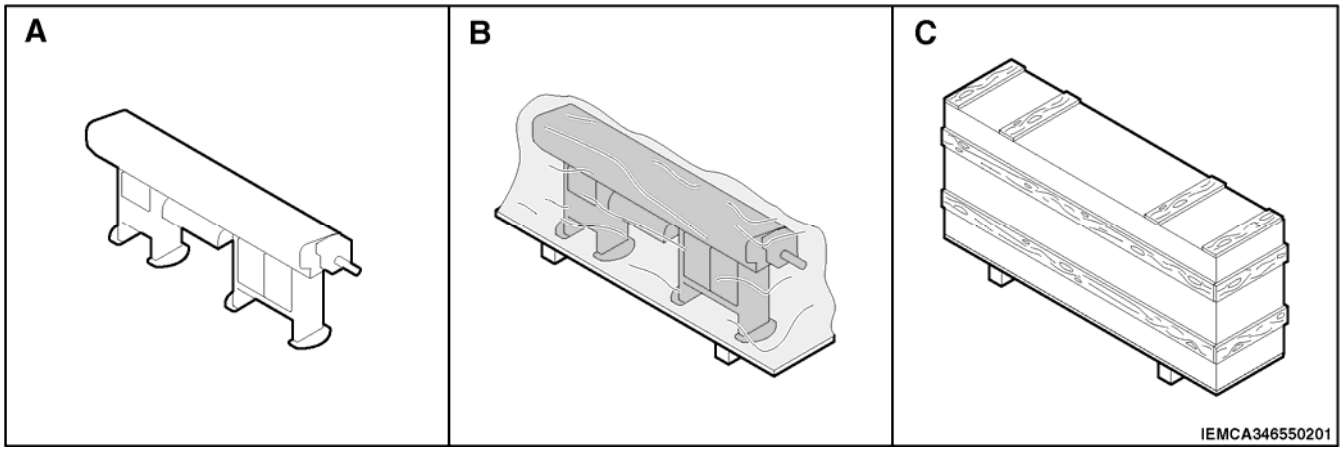
4.1 PACKAGING

There are three possible bar feeder packaging:
A WITHOUT PACKAGING.
B WITH PALLET: the bar feeder is placed on a pallet and wrapped with protective film.
C WITH CRATE: the bar feeder is contained in a crate and wrapped with protective film.



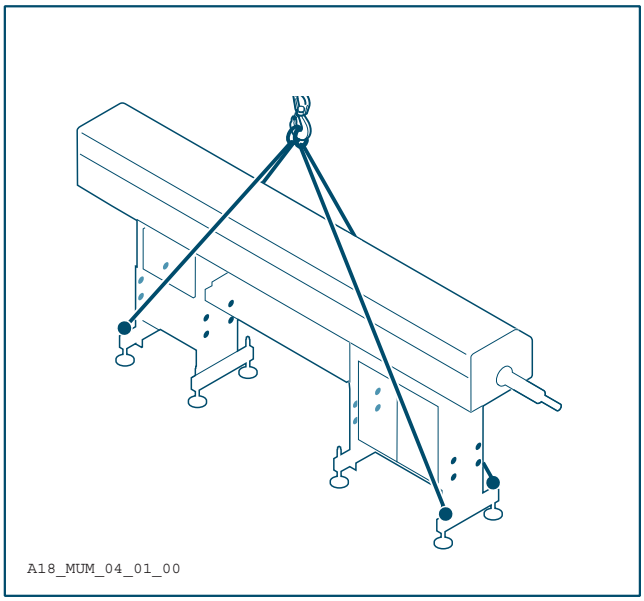
4.2 LIFTING

DANGER - WARNING:
handling and lifting operations should be carried out with suitable equipment (see weight table in "Technical data", Chap.2) and by specially trained and experienced personnel.

According to the packaging choice, lifting is carried out as shown in the next page.

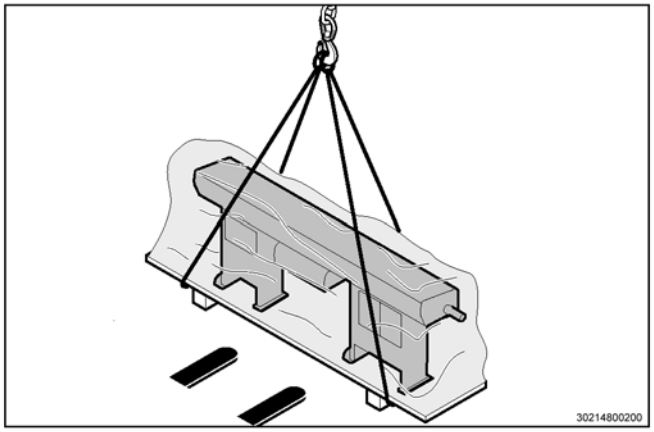
LIFTING WITH NO PACKAGING

- Insert the four eyebolts into the external plates of the bar feeder foot, in the positions shown in the picture.
- Use a hook type lifting device of suitable capacity.
- Use lifting belts of suitable capacity.
- Use lifting belts of suitable length so that the angle between them is not greater than 60°.



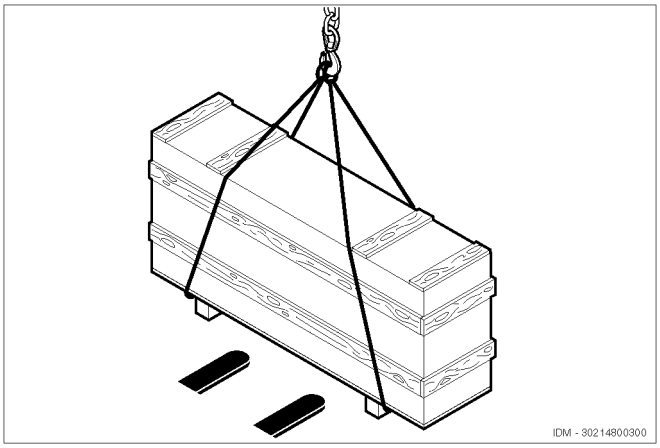
LIFTING WITH PALLET

- Use a hook (or fork) type lifting device of suitable capacity (see information on packaging).



LIFTING WITH CRATE

- Use a hook (or fork) type lifting device of suitable capacity (see information on packaging).

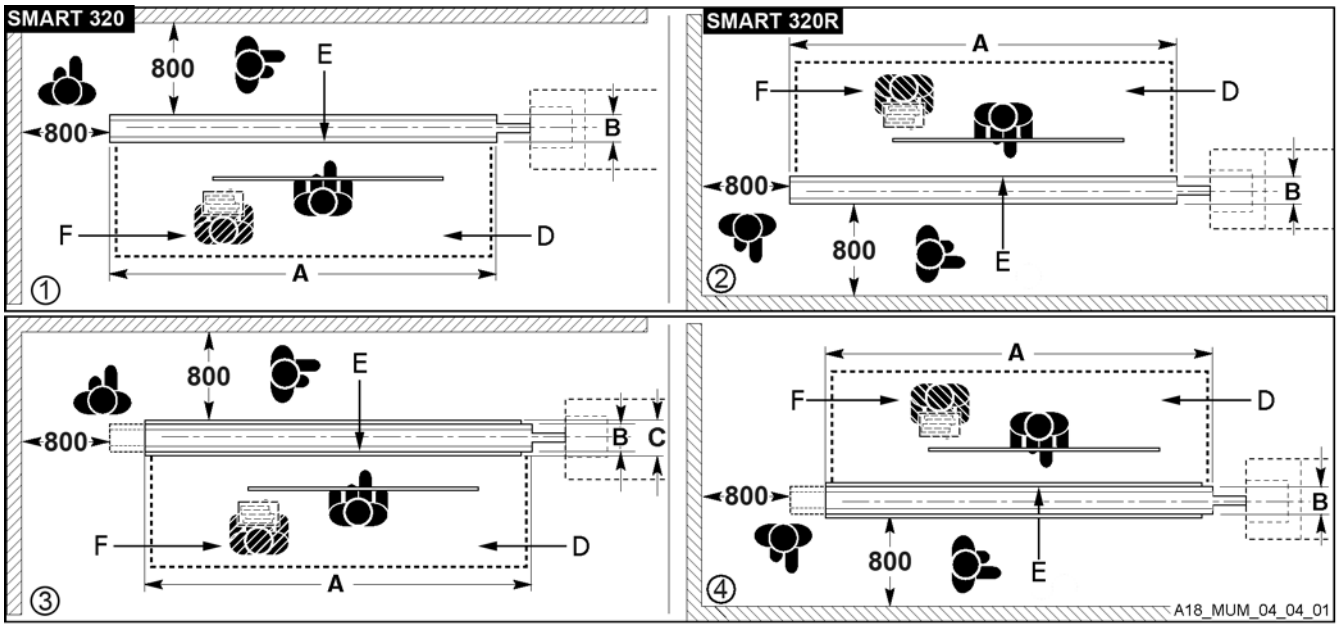


DANGER - WARNING:

never use any lifting systems or devices different from the ones above.

4.3 INSTALLATION AREA - FEATURES

The floor should be stable and levelled to guarantee good fastening to the ground.
Provide an area of suitable dimensions according to the type of bar feeder used.
The areas (D) (work area), (E) (bar feeding area) and (F) (remnant discharge area) should be properly delimited to prevent collisions between the operator and any handling equipment or transport vehicles travelling near the bar feeder.
The selected area should be illuminated and provided with an electric and pneumatic power supply socket.
During operation, the bar feeder will release small amounts of oil mist. Install the bar feeder in a suitably ventilated area.
The bar feeder has not been designed for use in an explosive atmosphere.



1-2 Without axial displacement
3-4 With axial displacement

Overall dimensions

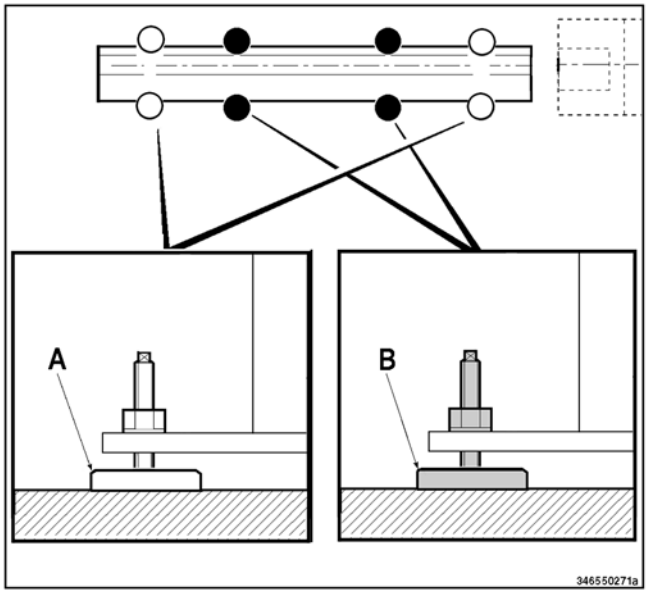
MODEL	VERSION	A (mm)	B (mm)	C (mm)
SMART 320	32	4000	425	425
	40	4800		

4.4 BAR FEEDER - INSTALLATION

Before carrying out the bar feeder installation, check the lathe stability; make sure that it is firmly fixed to the ground and that the spindle axis is perfectly in horizontal position.

4.4.1 Backing plates and support feet - Installation

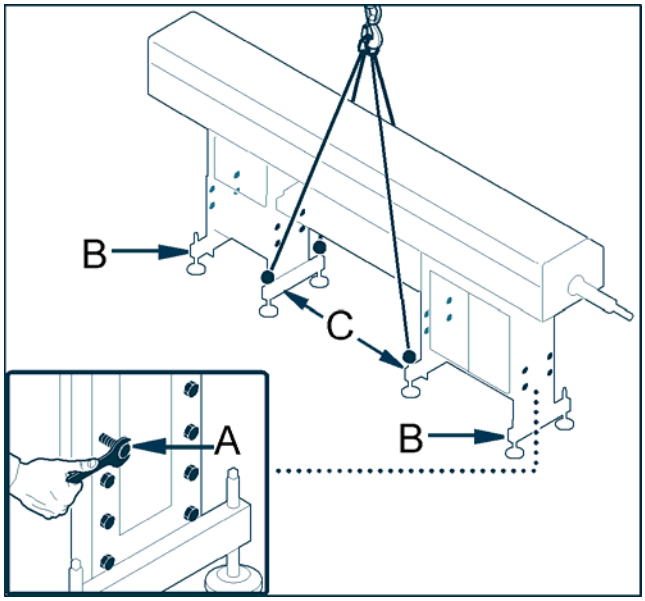
- Position the bar feeder next to the lathe.
- Keep it lifted and install the plates (A) and feet (B) in the positions shown in the figure.



4.4.2 Height - Adjustment

The bar feeder is normally supplied with the working axis height adjusted to the lathe height. However, if an adjustment is needed, proceed as follows:

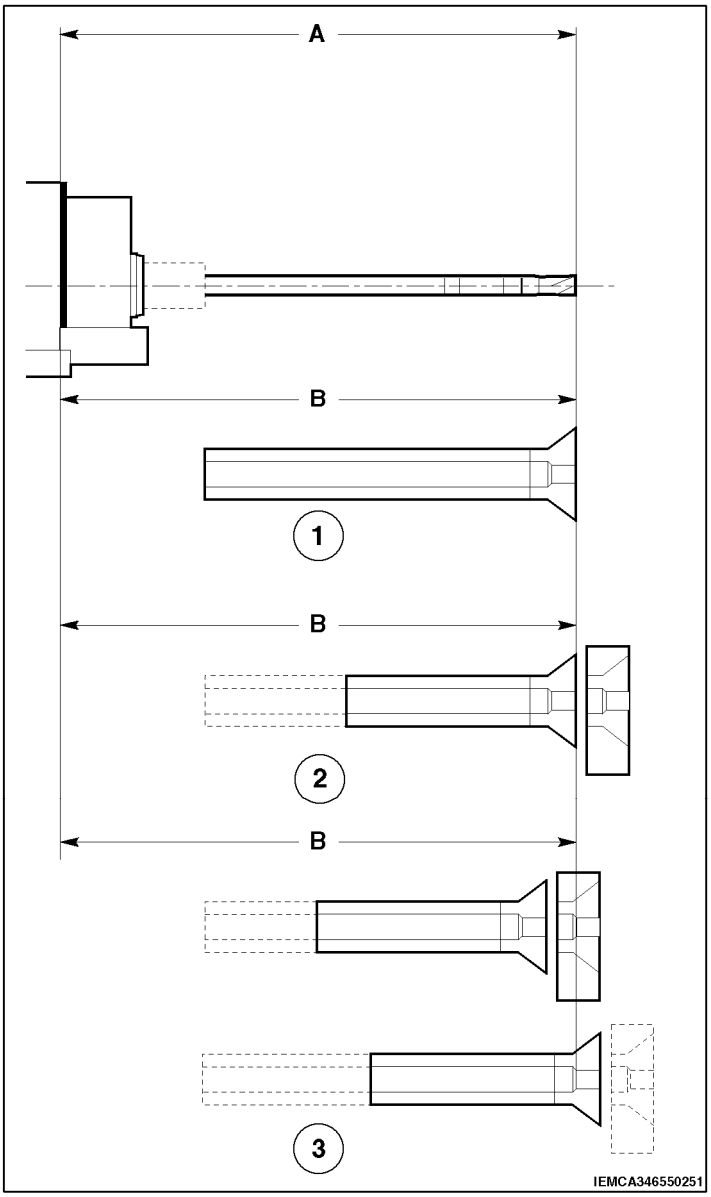
- remove the 8 screws (A) from the plates (B) on the outer side of bar feeder feet.
- fix the plates with the screws (A) on the suitable position to reach value "X" (see the “Working axis height” table, Ch. 2).
- repeat these steps also in the feet inner plates (C).



4.4.3 Preliminary positioning

- Position the bar feeder behind the lathe, considering the fixed and moving dimensions of both machines. The coupling distance (B) should not exceed the bar pusher maximum extension (A).

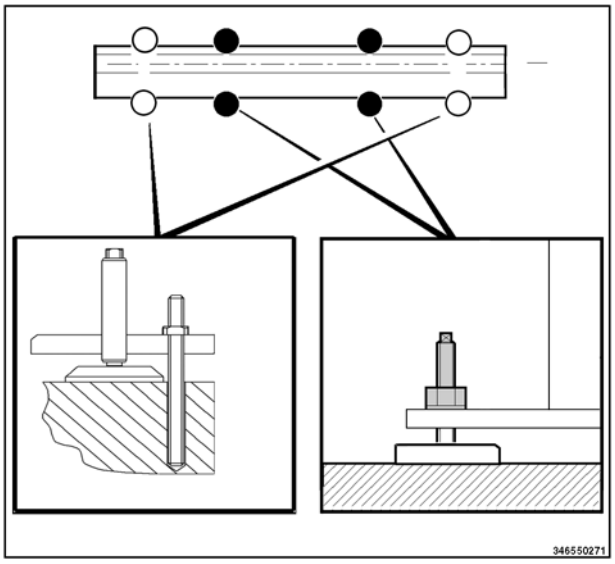
1 Fixed headstock or sliding rest lathe
2 Sliding headstock CNC lathe
3 Sliding headstock cam lathe



INFORMATION:

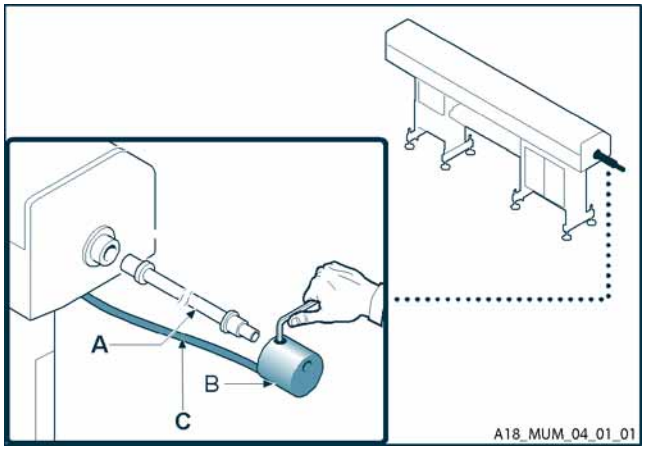
it is not always necessary to control the bar-pusher all the way out. In fixed headstock lathes, its stroke can be reduced to 100 mm to allow the feeder to be brought as close as possible to the lathe; contact IEMCA After-sales Service for more information.

- Roughly adjust the height of the working axis and the alignment with the lathe by turning the screws of the support feed.



4.4.4 Sleeve - Installation

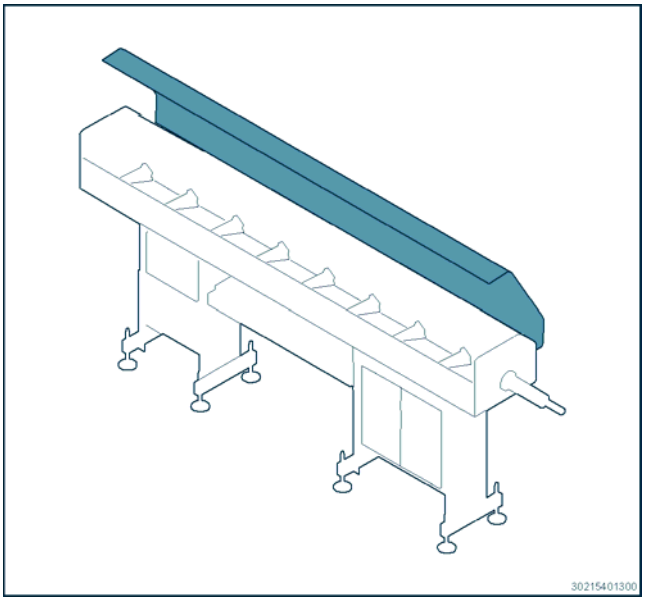
- Install the sleeve (A) on the front plate.
- Install the oil recovery tank (B).
- Connect the drain pipe (C) to the tank.



4.4.5 Levelling and alignment

FOREWORD

Alignment between the feeder and lathe is the most critical installation phase; therefore, this operation should be carried out by experienced personnel with the greatest accuracy.

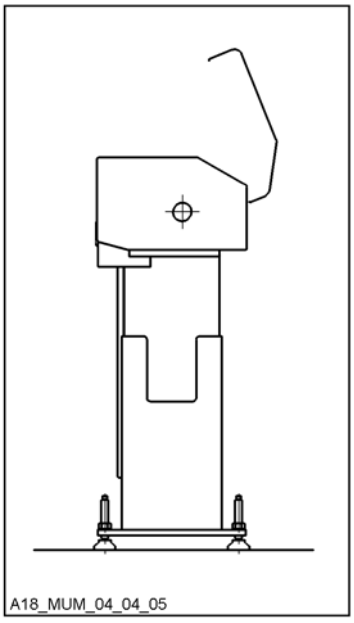


WARNING – CAUTION:

a mistake during the alignment may be the major cause of a bad operation of the bar feeder and of its consequent damage.

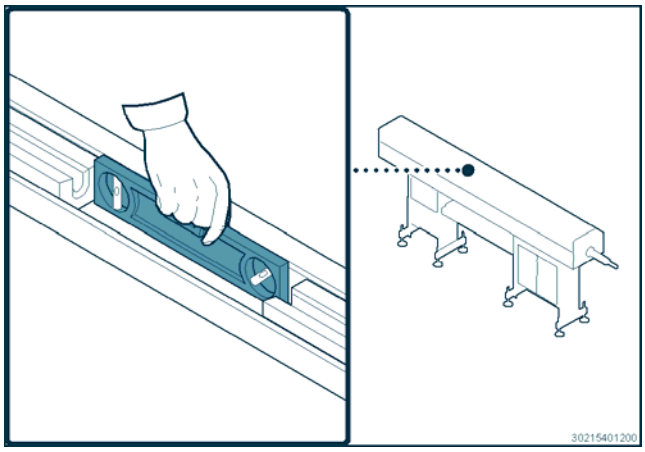
PRELIMINARY PROCEDURE

- Remove the upper guard.

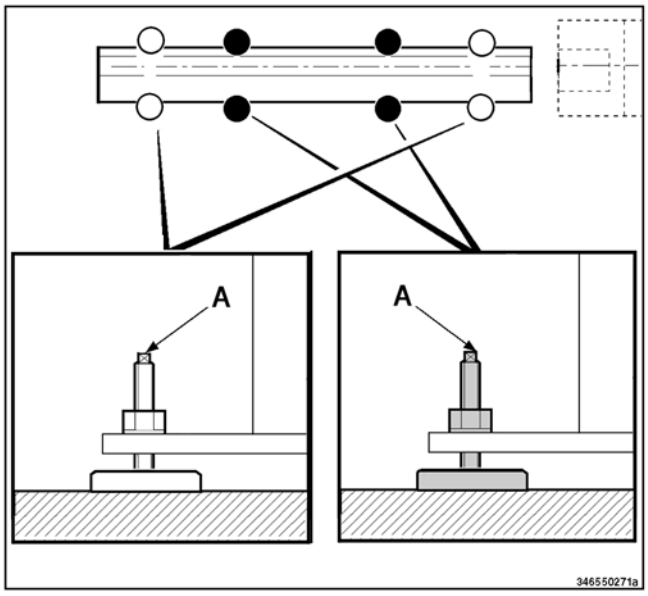


LEVELLING

- Check oil levelling by positioning the level crosswise and lengthwise on the supports of the lower guide channel.

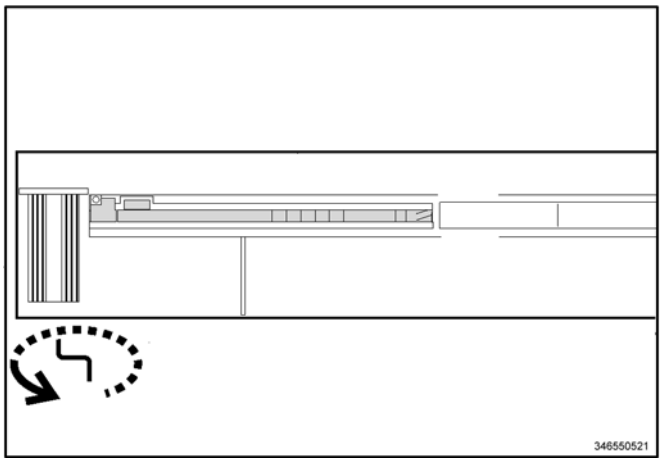


- Carry out the required modifications by turning the screws (A) on the support feet.

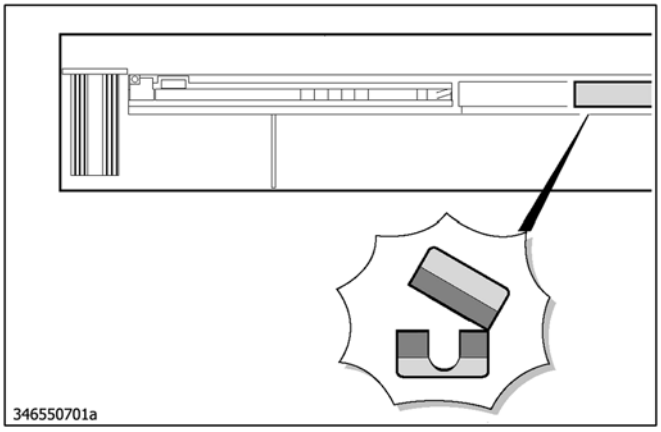


ALIGNMENT

- Insert the (supplied) crank in the intermediate drive shaft and move the bar-pusher to its backwards limit stop.

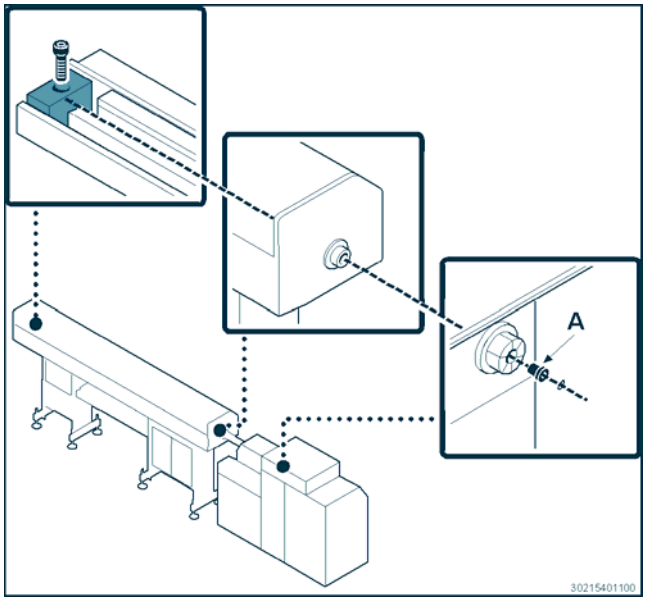


- Connect the pneumatic system to the power supply.
- Open the upper guide channels by pressing the manual key on the solenoid valve for guide channel opening/closing or, in case the bar feeder is also connected to the power supply, press the key for the guide channel opening/closing on the keyboard.



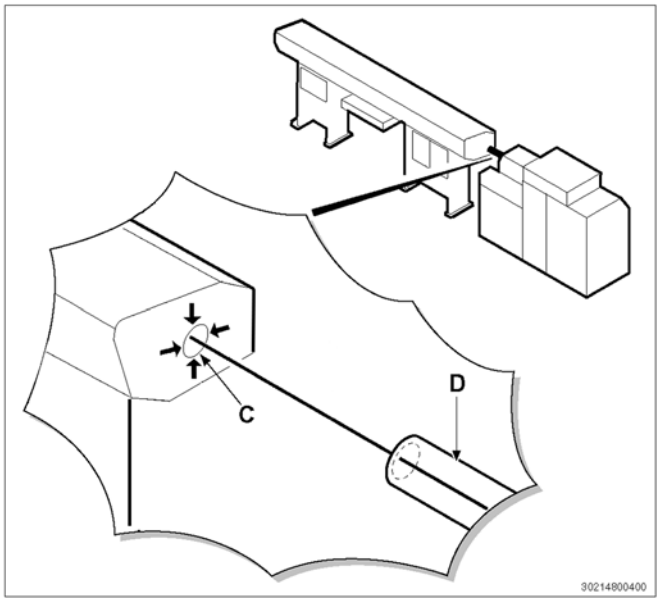
To obtain alignment insert a ø 1 mm nylon wire between the lathe collet and the tool which is placed before the lower and rear guide channel, proceeding as follows:

- place a drilled bush (A) in the lathe collet;
- stretch out the wire to the hole in the tool which is placed on the lower guide channel.



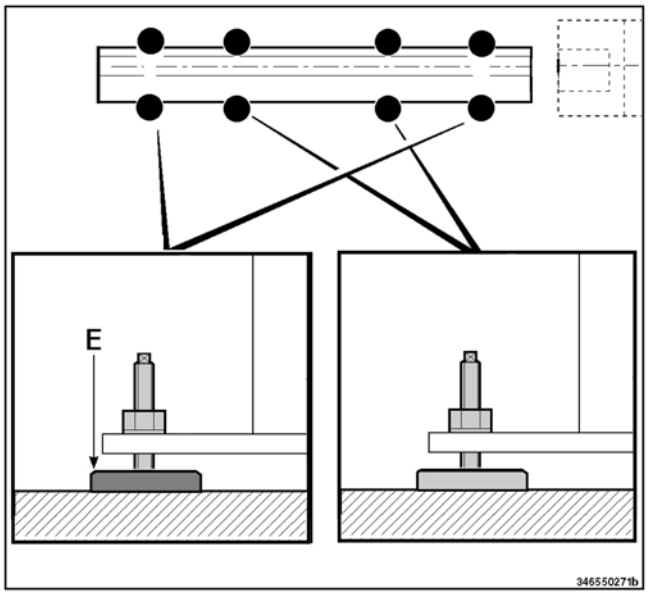
- check with a sliding caliper, the alignment near bushing (C) and spindle (D); use a tolerance of ± 0.15 mm in the four directions.

- prepare a perfectly straight ground bar, with an external diameter equal to the maximum spindle bar passage and with a length equal to the double coupling distance (see (B) in the “Preliminary Positioning” paragraph, Chap. 4);
- place the bar in the guide channel and cause it to slide forwards and backwards in the spindle, until the lathe collet area is reached.



POSITIONING ADJUSTMENTS

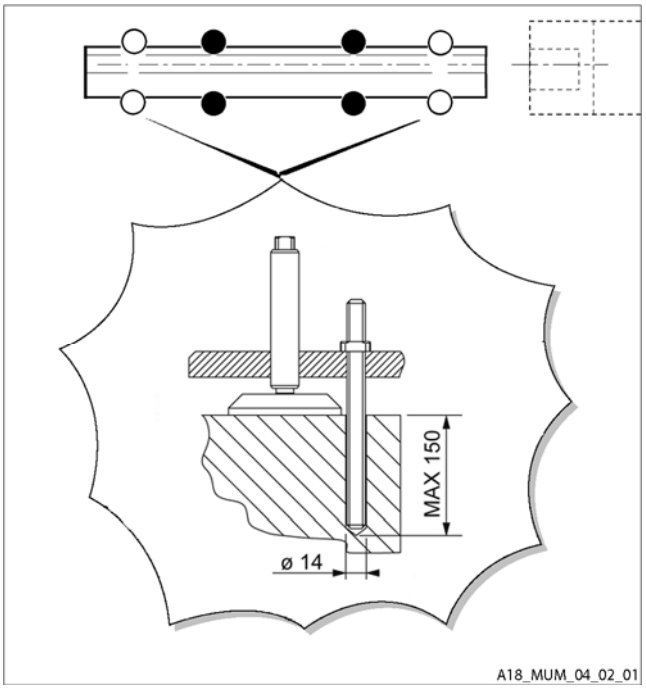
After checking the alignment of the bar feeder with either the thread or the bar, any required corrections should be carried out.
Adjust height by turning the screws in the support feet; carry out lateral adjustments with calibrated mallet blows on the sides of plates (E). During this phase, any adjustment carried out during the levelling phase should be preserved; therefore, in most cases, it is necessary to find the correct adjustment of the bar feeder position.



4.4.6 Bar feeder fastening

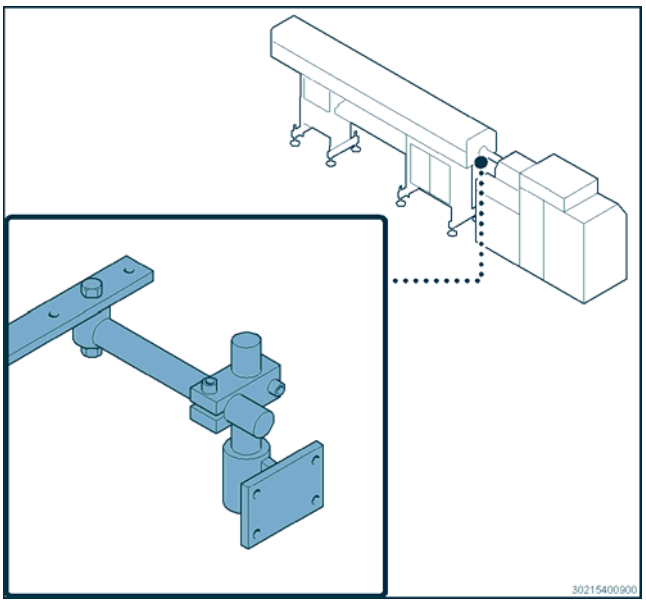
GROUND FASTENING

- Drill the floor and fix the lifting foot with expansion plugs.
- Check the levelling and alignment once more.
- Remove all the equipment used for the levelling and alignment phases and restore the initial bar feeder conditions.



FASTENING TO THE LATHE

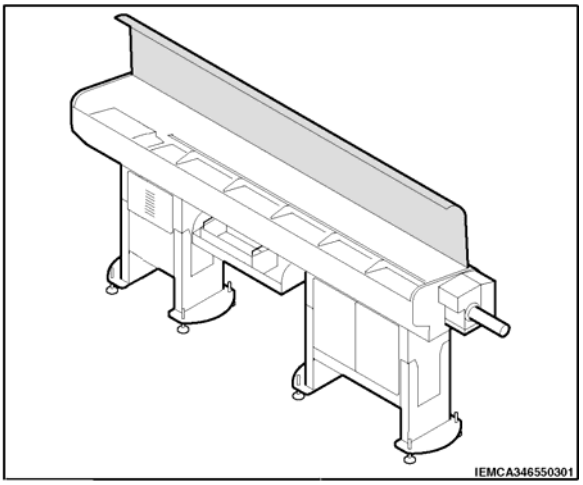
Wherever possible, the feeder should be fastened to the lathe through the suitable coupling unit according to lathe make and type. The figure shows a general example of fastening; contact IEMCA service department for more information.



4.5 DEVICE FOR SLIDING HEADSTOCK LATHES - INSTALLATION

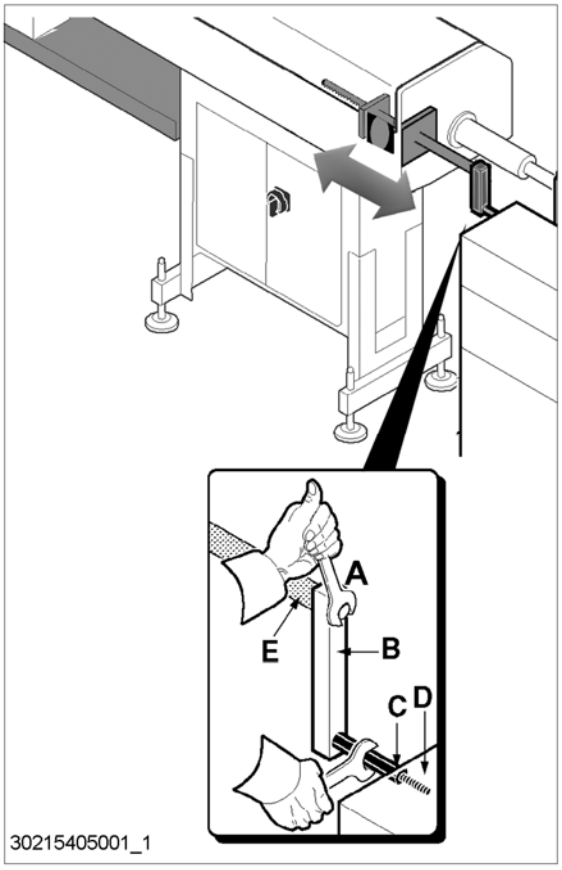
4.5.1 Bar / headstock synchronizing device

- Remove the upper guard.



INFORMATION:
the figure shows a general example of installation; contact IEMCA service department for more information.

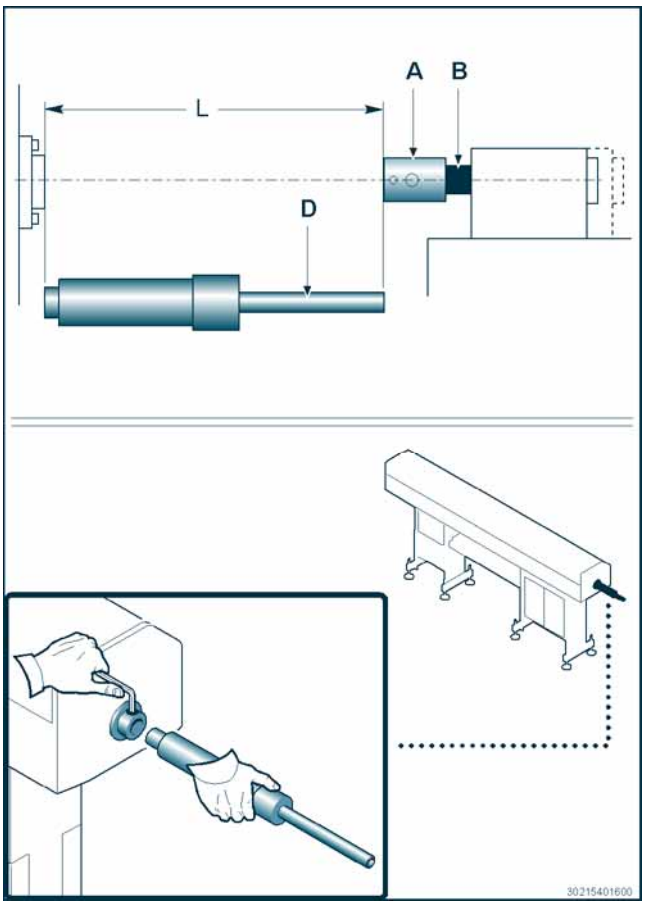
- Loosen screw (A).
- Install the bar (B) and tie-rod (C) and make sure that the headstock (D) can run freely throughout its stroke together with shaft (E).
- Position the support "F" so that it does not hinder the headstock stroke and tighten the screw (A).



4.5.2 Telescopic nose - Installation

If the feeder is equipped with a telescopic nose, proceed as described below.

- Remove the fixed sleeve that had been installed to obtain alignment between the feeder and the lathe.
- Fix the flange (A) (a general example is shown in the figure).



INFORMATION:

the lathe spindle nose (B) should not turn. If it does, a bearing or another similar device should be mounted to prevent telescopic nose turning after it has been installed.

- Move the headstock to its "all the way back" position and measure the dimension (L). Push the telescopic nose to the end of travel (less 5 mm) and cut tube (D) to the value measured.
- Move the headstock to its "all the way forwards" position. Install the sleeve on the plate (F).
- Check smooth sliding of the telescopic nose by moving the headstock forwards and backwards.

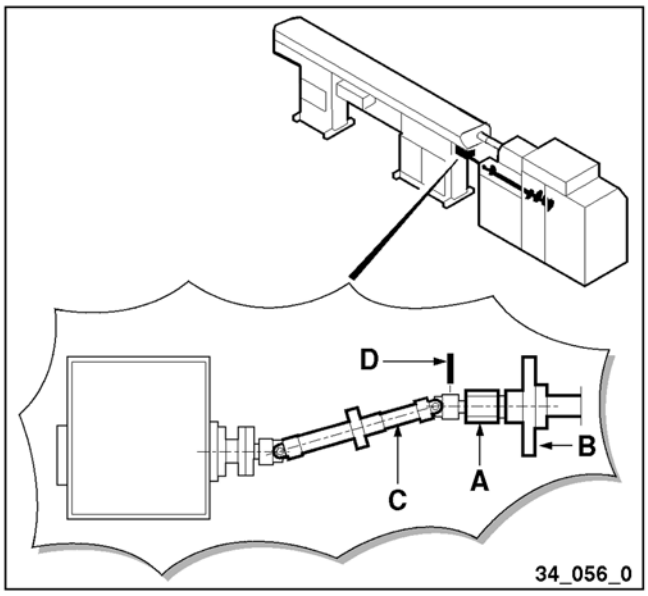
4.6 DEVICES FOR CAM LATHES - INSTALLATION

4.6.1 Cam box

INFORMATION:

the figure shows a general example of installation; contact IEMCA service department for more information.

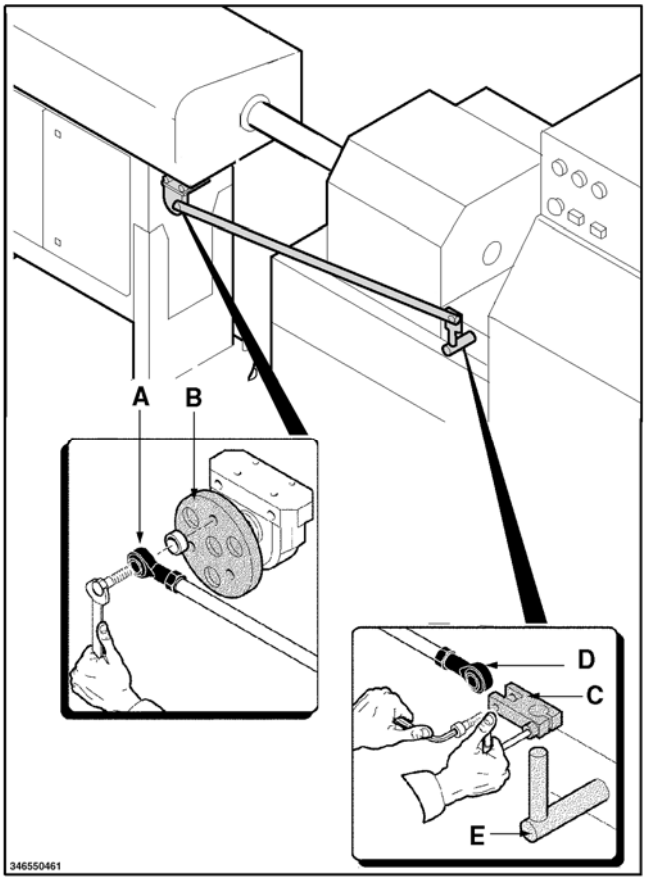
- Install the sleeve (A) on the lathe camshaft (B).
- Connect the shaft (C) to the sleeve through the pin (D).



4.6.2 Camshaft release device

INFORMATION:

the figures show a general example of installation; contact IEMCA service department for more information.

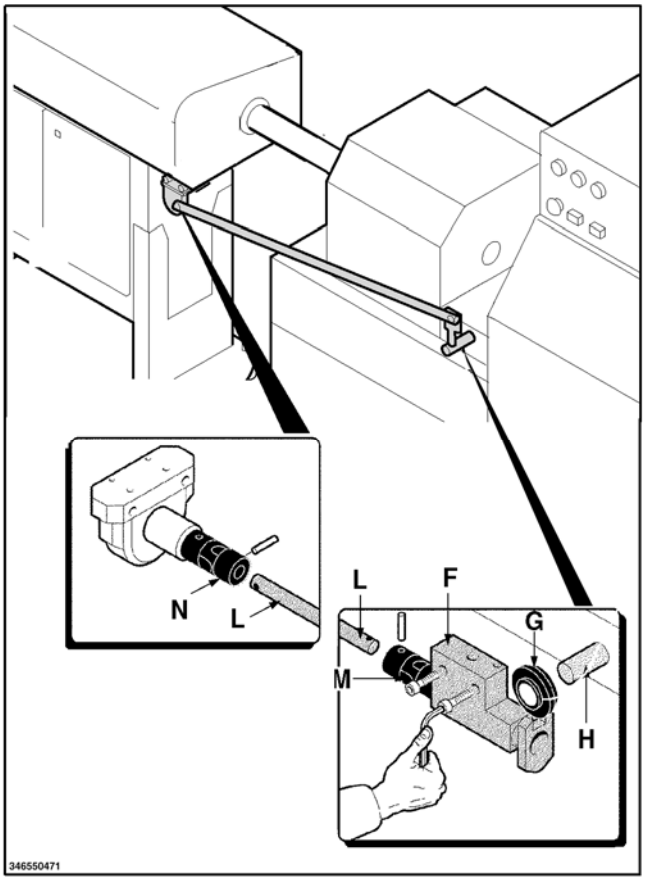


Radial version

- Mount the articulation (A) in the flange (B).
- Mount the joint (C) in the articulation (D) and in the lathe control (E).

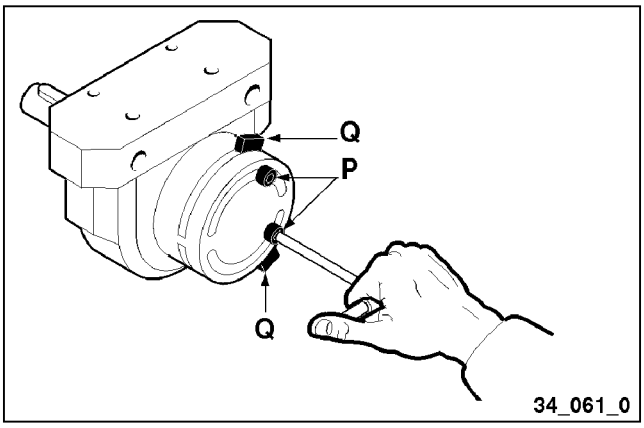
Axial version

- Drill and thread the lathe housing to fix the transmission unit (F) and assemble the disk (G) in the control (H).
- Insert the shaft (L) in the joint (M) and lock it with a pin; insert the other end of shaft (L) in joint (N) and lock it with a pin.



After completing the above-described operations, the actuator rotation stroke should be adjusted (this operation is necessary for both the radial version and the axial version).

- Loosen the screws, move slides (Q) and tighten screws (P).

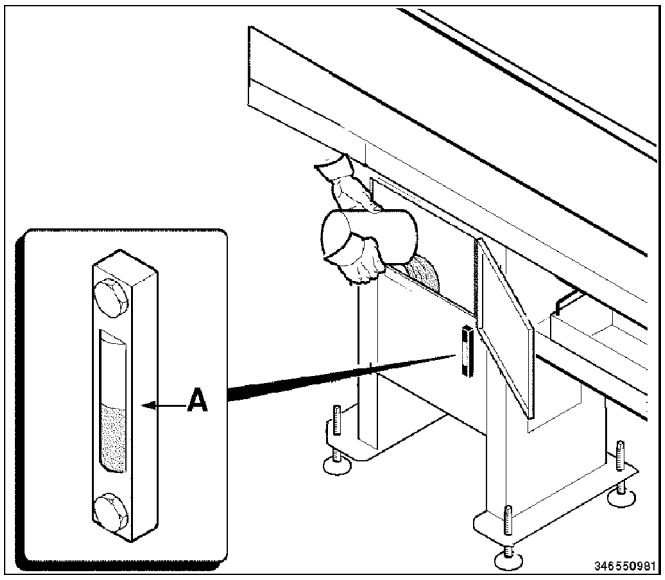


4.7 LUBRICATION OIL - FILLING

WARNING – CAUTION:
wear personal protections according to the regulations in force.

- Open the rear base door and pour oil into the tank.
- Check the level by means of the indicator (A).

See § "Technical Data", in Chap. 2, for the comparative table.



4.8 ELECTRICAL CONNECTION

DANGER - WARNING:

this type of operation should only be entrusted to skilled personnel with precise technical competence and specific abilities to comply with the applicable standards and regulations in force.

DANGER - WARNING:

the feeder must be electrically connected to the lathe, which in turn must be electrically connected to the plant wiring system in compliance with the applicable regulations in force.

With the following instructions we would like to underline the importance of the connection of the electrical interface.
The bar feeder is normally provided with one ore more multiple plugs to plug into the special lathe outlets. The interface signals are wired to these outlets and can be classified into three types:

- Three-phase power supply
- Safety signals
- Function signals

4.8.1 THREE-PHASE POWER SUPPLY

The bar feeder should be provided with three-phase voltage and with a suitable earthing connection.
The three-phase supply line should also be protected by means of a suitable magneto-thermal switch (check the installed power on the plate of the electrical control panel door).

4.8.2 SAFETY SIGNALS

The above mentioned signals can be used by the hardware only and in agreement with the current electrical safety norms (see current machine directives).

INFORMATION:

when the safety class 3 is mentioned in the following points, please refer to its corresponding regulations.

4.8.2.1 EMERGENCY STOP

4 emergency channels are available, 2 from bar feeder to lathe and 2 from lathe to bar feeder.

- **Emergency from bar feeder to lathe (2 channels, contacts on = Emergency activated).**

It allows transmitting the active emergency state from the bar feeder to the lathe.
These signals should be integrated with the lathe emergency signals, so that in case of an emergency stop, the whole unit (lathe/bar feeder) is stopped.

- **Emergency signal from lathe to bar feeder (2 channels, contacts on = Emergency activated).**

It allows transmitting the active emergency state from the lathe to the bar feeder.
As soon as the bar feeder receives these signals, an emergency stop (safety class 3) is activated.

4.8.2.2 GUARD SAFETY STOP (IF PROVIDED)

4 guard safety channels are available, 2 from bar feeder to lathe and 2 from lathe to bar feeder.

- **Guard safety signal from the lathe to the robot (2 channels, contacts on = open guards).**

Whenever the above mentioned channels are closed, the bar feeder informs the lathe that the guards are closed: all lathe operations, displacement included, are now allowed.
Whenever one of the bar feeder guards is open, these signals are stopped: in this case, the lathe immediately stops (safety class 3) all the movements that may harm the operator (e.g. in the multispindle, the spindle drum displacement).
As soon as the contacts are closed, the lathe will start operation again.

- **Guard safety signal from lathe to bar feeder (2 channels, contacts on = open guards).**

Whenever the above mentioned signals are closed, the lathe informs the bar feeder that the guards are closed: the bar feeder can move the bar pusher forwards.
As soon as one of the guards on the lathe is open, the bar pusher is stopped immediately, in agreement with safety class 3, to avoid injury to the operator.
Some jumpers may be fitted on the safety signals for testing purpose only. Therefore, they should be removed in order to restore the safety devices.

DANGER-WARNING !!!
The bar feeder safety depends on these connections, therefore IEMCA is not responsible for any possible damage to persons or things, caused by improper use of the above mentioned signals.

4.8.3 FUNCTION SIGNALS

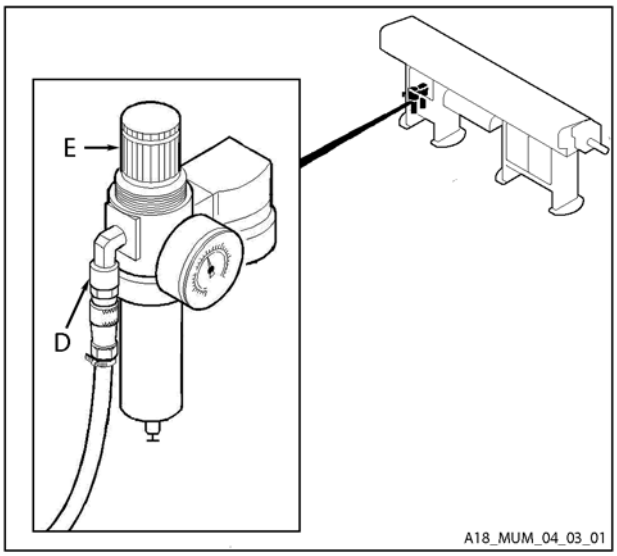
The bar feeder can send and receive all the signals which are necessary to its correct operation. These signals are managed by a PLC, and can be grouped into: inputs (signals from lathe to bar feeder) and outputs (signals from bar feeder to lathe).
The signals that have been implemented are the result of our long experience and allow the connection with every type of lathe: it is therefore possible that only some of them are used.

IMPORTANT:

for any other information you may need, please refer to the interface wiring diagram or contact us: our Customer Service and Engineering Department are always at your disposal.

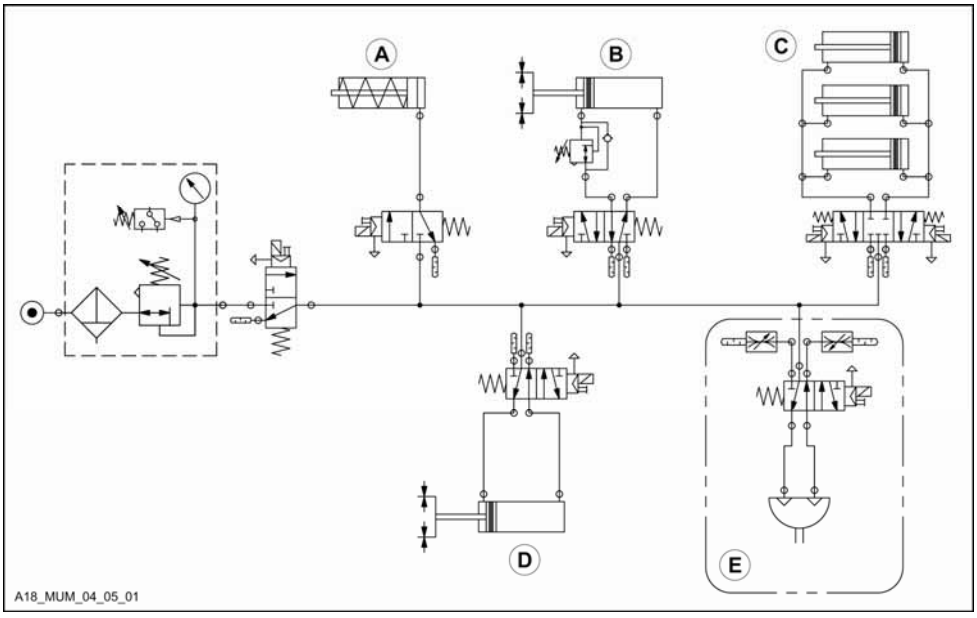
4.9 PNEUMATIC CONNECTION

- Connect the pipe of the pneumatic system to the coupling (D) 1/4"Gas. Install an upstream 3-way cock to perform the sectioning and the pressure release. With knob (E), adjust the pressure at 6 bar.



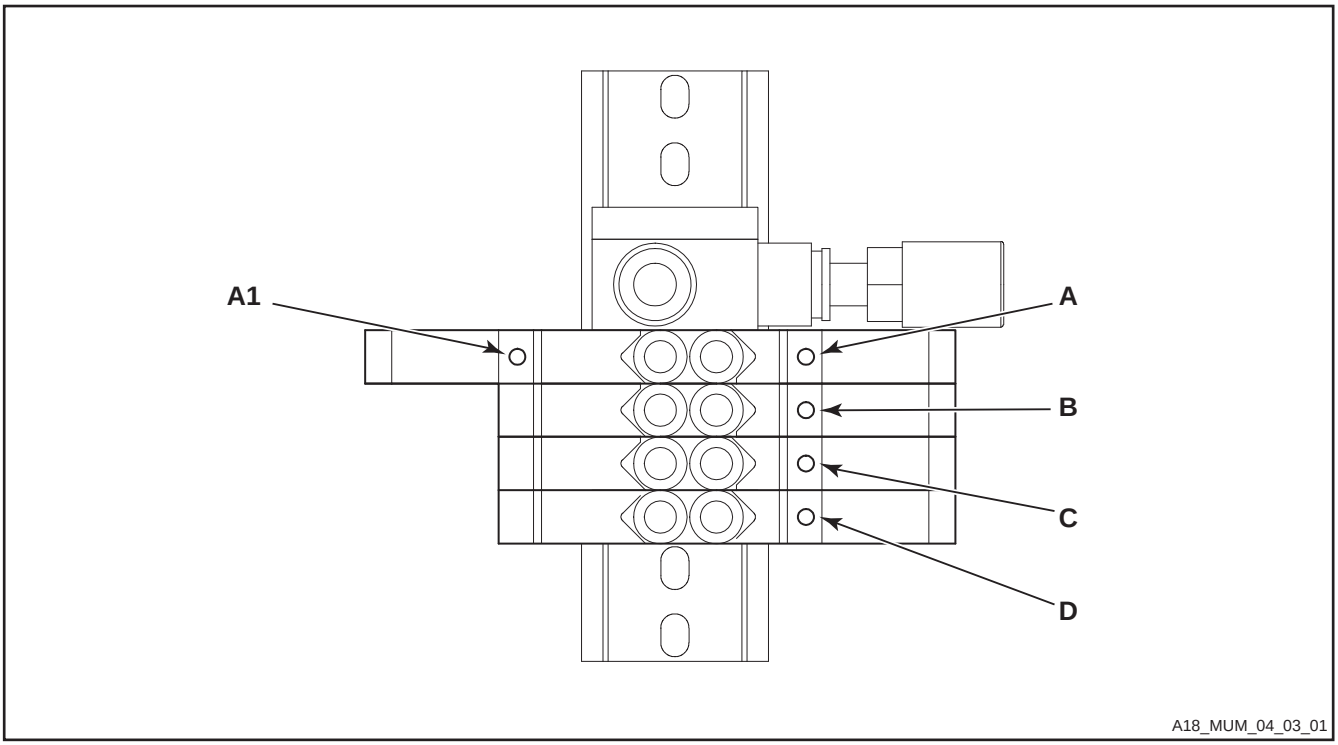
IMPORTANT:
the supply air must be filtered.

4.9.1 Pneumatic system - Main components



A FACING CYLINDER
B PNEUMATIC CLAMP CYLINDER
C GUIDE CHANNEL OPENING/CLOSING CYLINDERS
D BUSH HOLDER OPENING/CLOSING CYLINDERS
E CAMSHAFT ENGAGEMENT/DISENGAGEMENT ACTUATOR

4.9.2 BAR FEEDER HANDLING WITHOUT POWER SUPPLY



Without power supply or in case of an emergency it is possible to move the pneumatic units using the solenoid valves manually:

- By means of a small screwdriver press button (A) to position 1.
- With the same tool press button B, located on each solenoid valve, to move the unit.

FUNCTION	DESCRIPTION	ABBREVIATION
A	Guide control solenoid valve	Guide channel closing
A1	Guide control solenoid valve	Guide channel opening
B	Clamp control solenoid valve	Clamp opening/closing
C	Bush control solenoid valve	Bush opening/closing
D	Flag control solenoid valve	Facing flag resetting

4.10 SOFTWARE PARAMETERIZATION

The bar feeder software should be correctly parameterized according to the working needs and the lathe type.
For further information on how to carry out this operation, check the "Keyboard instruction manual".

INDEX

5.1 ADJUSTMENT AND SETUP - FOREWORD

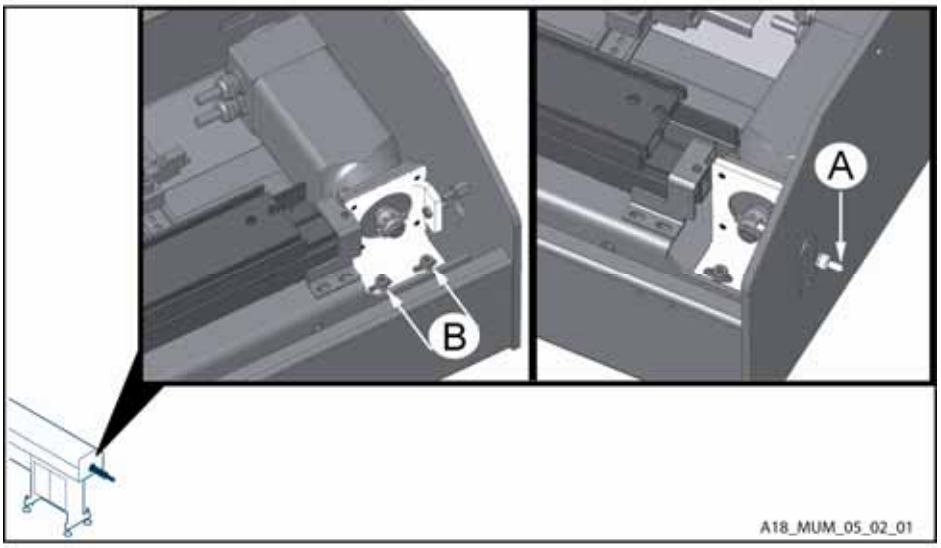
DANGER - WARNING:
do not perform any adjustment when the bar feeder is running unless expressly requested in the manual.

In addition to normal adjustments throughout its service life, this bar feeder also needs set-up according to the type of operation. According to bar size and type of machining, setting up may also include replacement of a few components. These operations are listed and then described below.

5.2 GENERAL ADJUSTMENTS - FOREWORD

Including all the necessary adjustments for a good feeder operation. They may become necessary after maintenance, trouble fixing or component replacement.

5.2.1 Feeding chain - Adjustment

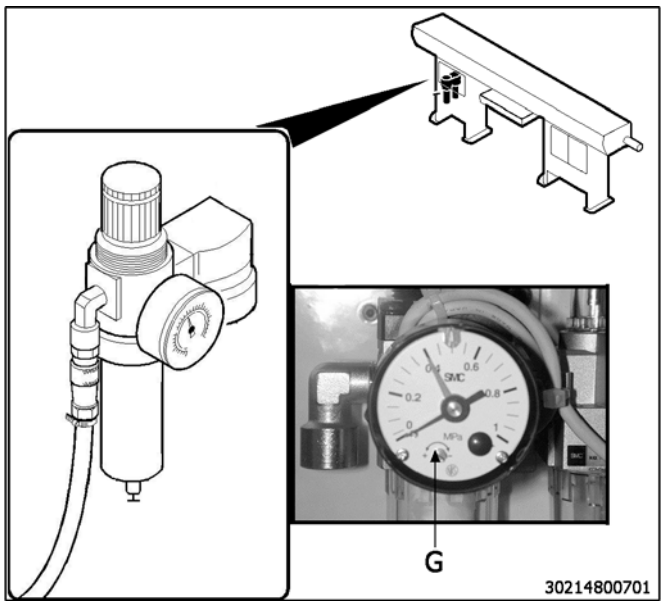


Turn the tension screw (A) on the front plate of bar feeder to adjust the tension of the chain driving the bar pusher.
After some bar feeder operating hours, the chain tension has to be checked.
The chain must be adjusted as follows:

- Loosen both screws (B) and adjust the chain tension by turning screw (A).
- Restore the bar feeder initial operating conditions.

5.2.2 Pressure switch - Adjustment

After unscrewing the glass protection, the pressure switch can be properly adjusted by turning the special adjusting screw (G). Proper setting is 4.5 bar (0.45 MPa).



WARNING – CAUTION:

Do not further turn counterclockwise when the green pointer is on 0, as this may cause damage to the pressure switch.

5.3 SET-UP ACCORDING TO THE BAR TO BE MACHINED

According to the "new" diameter of the bar to be machined, a few or several operations must be carried out based on the diameter of the previously machined bar.
The table “SMART 320 V-shaped bush diameter” shows the max. and min. suitable diameters for the correct operation of the bushes. The table “SMART 320 guide channel, bar pusher, bar and pipe diameters” shows the available guide channel diameters with the corresponding range of bar pushers to be mounted and the range of diameters of the bars to be machined.

Bush adjustment according to the bar to be machined

Diameters of V-shaped bushes for SMART 320

MODEL	BAR DIAMETER		BUSH TYPE
SMART 320	MIN	MAX	
	3	16	V
	8	20	V

For shaped bars (e.g. square or hexagonal), the bush holder device should be disabled.

Guide channel, bar pusher, bar and pipe diameters SMART 320.

Bar lathe passage (mm)	Guide channels diameter (mm)	Bar pusher diameter (mm)	Revolving tip diameter (mm)	Bar diameter (mm)		Pipe max diameter (mm) (*)
				MIN	MAX	
8	8	7	7,5	3 (1/8")	5,5 (7/32")	7 (9/32")
9	11	10/7	8,5	4 (11/64")	6,5 (17/64")	8 (5/16")
11		10	10,5	4 (11/64")	8 (5/16")	10 (13/32")
11	13	12/10	10,5	4 (11/64")	8 (5/16")	10 (13/32")
13		12	12,5	4 (11/64")	10 (13/32")	12 (15/32")
16	17	16/15	15,5	5 (13/64")	13 (33/64")	15 (19/32")
17		16	16,5	5 (13/64")	14 (9/16")	16 (41/64")
19	21	20/18	18,5	6 (1/4")	16 (41/64")	18 (23/32")
20			19,5	6 (1/4")	17 (43/64")	19 (3/4")
21		20	20,5	6 (1/4")	18 (23/32")	19 (3/4")
22	24	23/20	21,5	8 (5/16")	18 (23/32")	20 (51/64")
23			22,5	8 (5/16")	20 (51/64")	20 (51/64")
24		23	23,5	8 (5/16")	20 (51/64")	20 (51/64")

(*) Valid also for prepared bars or normal bars machined with front remnant ejection.

WARNING – CAUTION:

barstock diameters for any guide channel are only given as an example. If the diameter is approximately 8 mm smaller than the guide channel diameter this may cause the bar feeder vibration and failure. Therefore, it may be necessary to slow down the bar rotation speed or to change the guide channel diameter in order to obtain the best performance for a specific application.

WARNING – CAUTION:

the collet external diameter should be at least 0.5 mm smaller than the bar pusher external diameter.

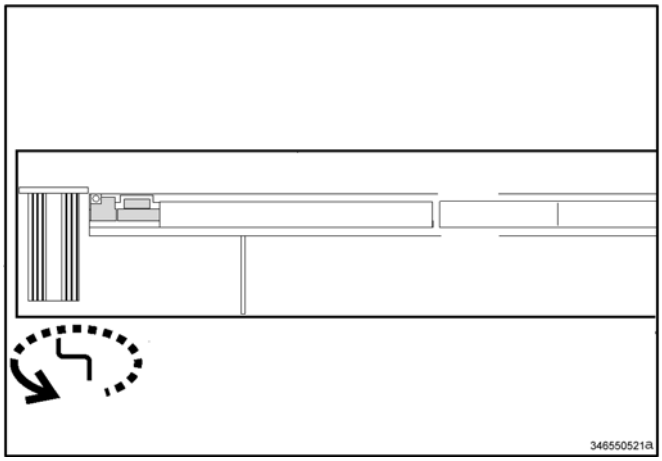
INFORMATION:

the bar feeder is usually supplied with a bar pusher whose diameter is equal to the spindle drawbar hole of the lathe. Sometimes, in order to ensure the best working conditions, the use of a bar pusher with a smaller diameter may be necessary.

5.3.1 Guide channels, half-bushings, bar pusher and collet - Replacement

- When the magazine is empty (no bars) set the bar feeder to manual mode 

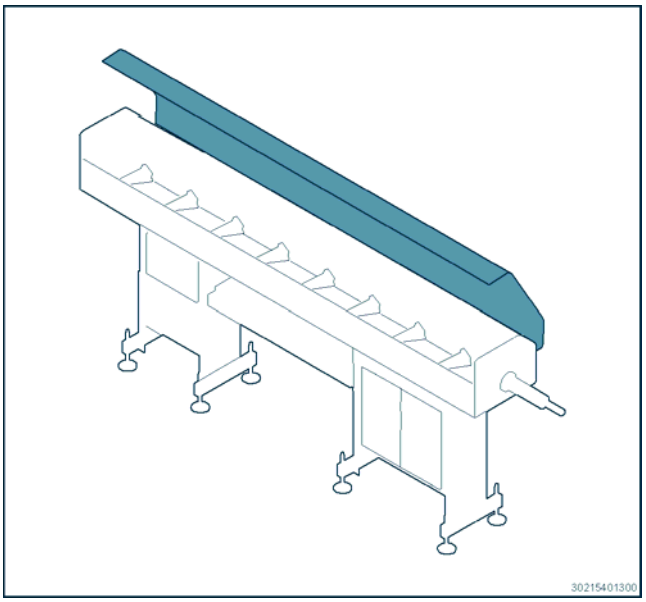
.



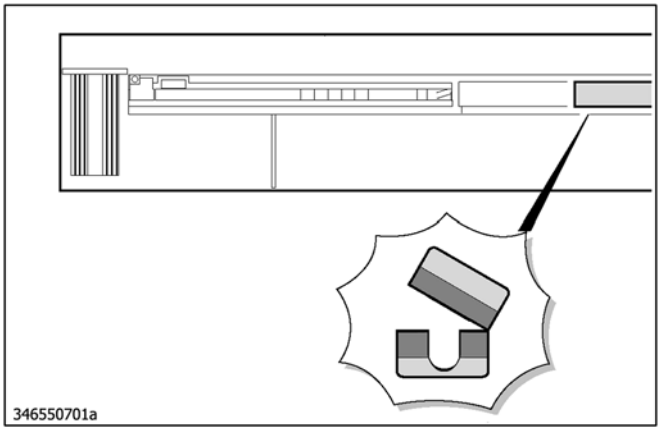
- Press 

on the keyboard or use the crank so as to bring the bar pusher to its back limit stop.

- Remove the upper guard.

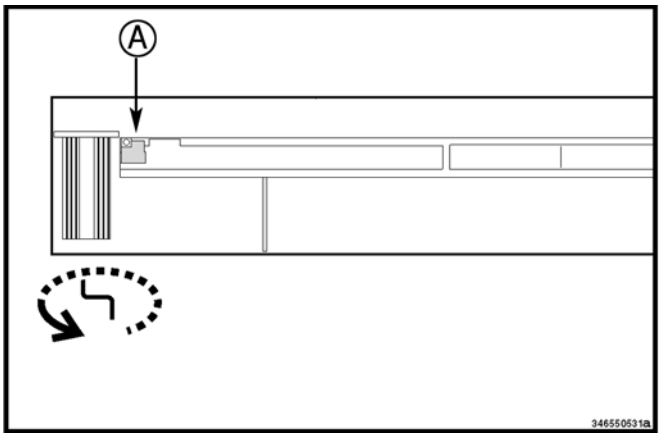


- Open the upper guide channels using the manual control on the solenoid valve.
- Remove and replace the bar pusher.

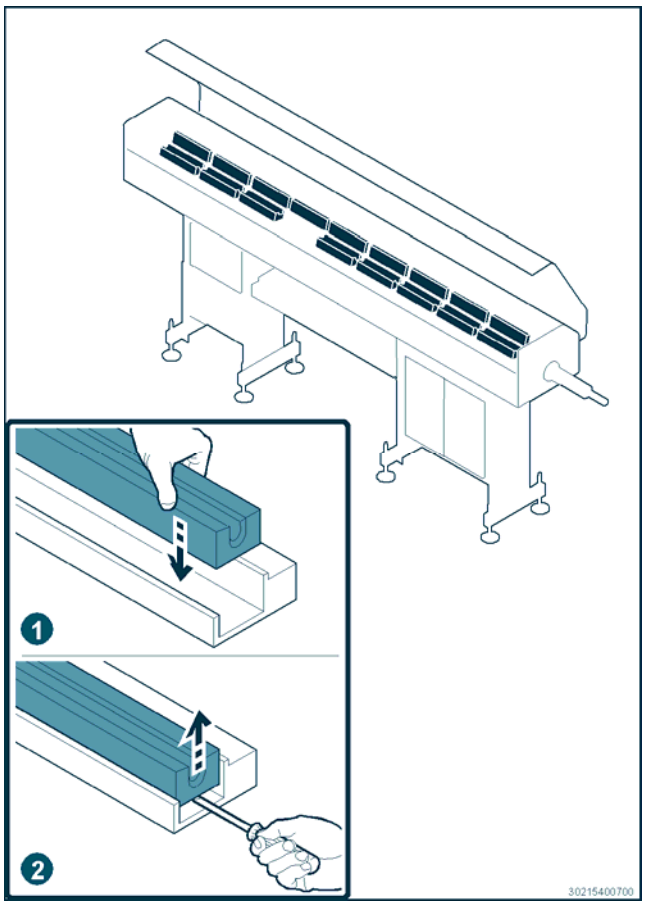


Three types of first feeding flag are available: one for diameters from 8 to 11mm, the second for diameters from 13 to 17mm and the third for diameters from 21 to 24 mm.
Replacement should be carried out as follows:

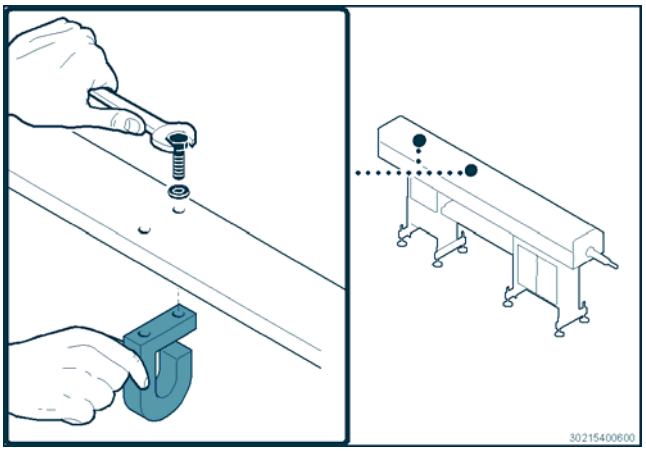
- bring the first feeding flag to its back limit stop and loosen both fixing screws (A).



- Now remove and replace the lower guide channels.
- Do not replace or adjust the upper guide channels even if the bar pusher diameter is different.

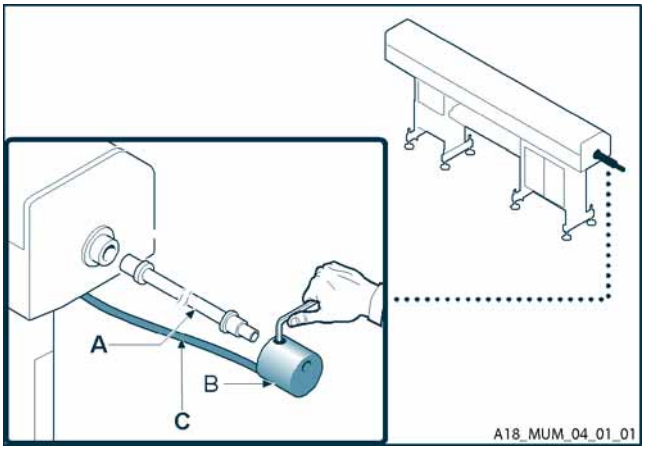


- Replace the bar pusher supports.

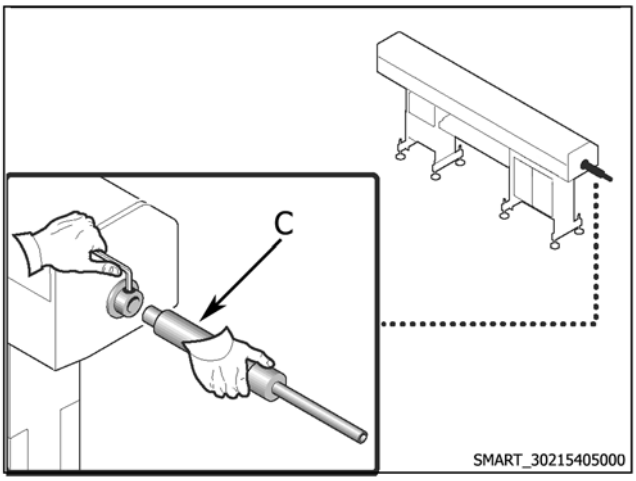


Fixed nose
Remove the nose as follows:

- Remove the oil recovery device (B) and sleeve (A).

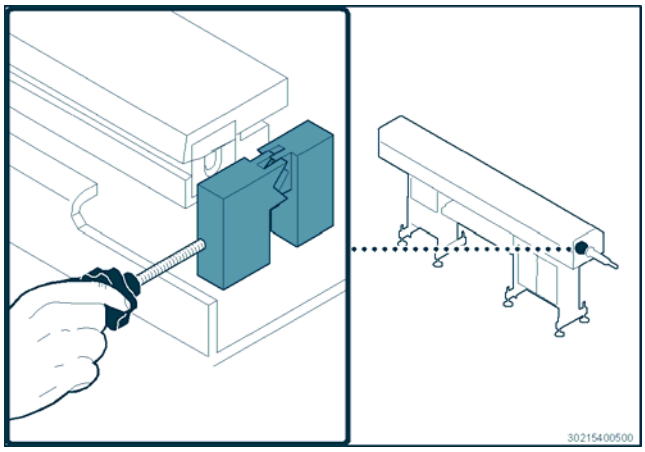


Telescopic nose
- Remove the sleeve (C).

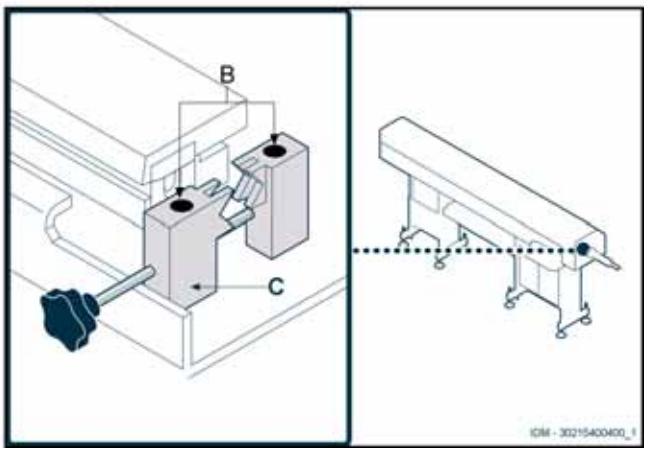


Adjust the front half-bushes as follows:

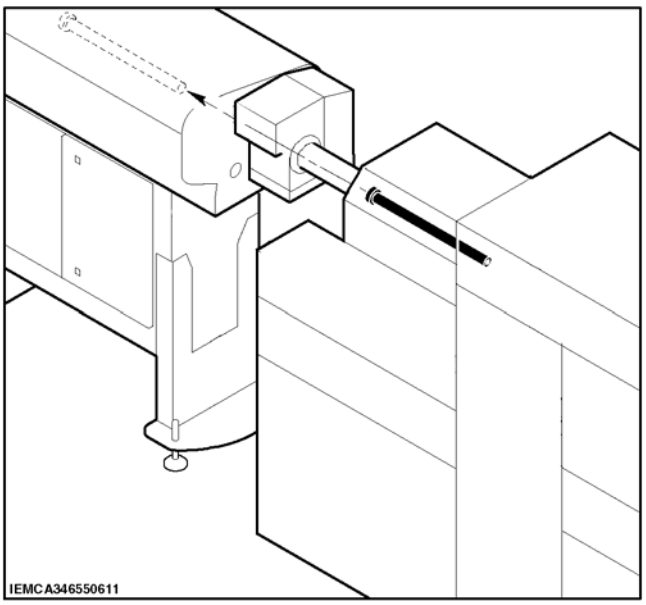
- Press the manual control on the solenoid valve for bush opening/closing to close the half-bushes.
- Now turn the knob either way to reach the diameter of the bar: make sure the bar can slide freely.



- Replace the half-bushes in case of wear or when changing the machining range: loosen the screws (B) and replace the bushes (C).



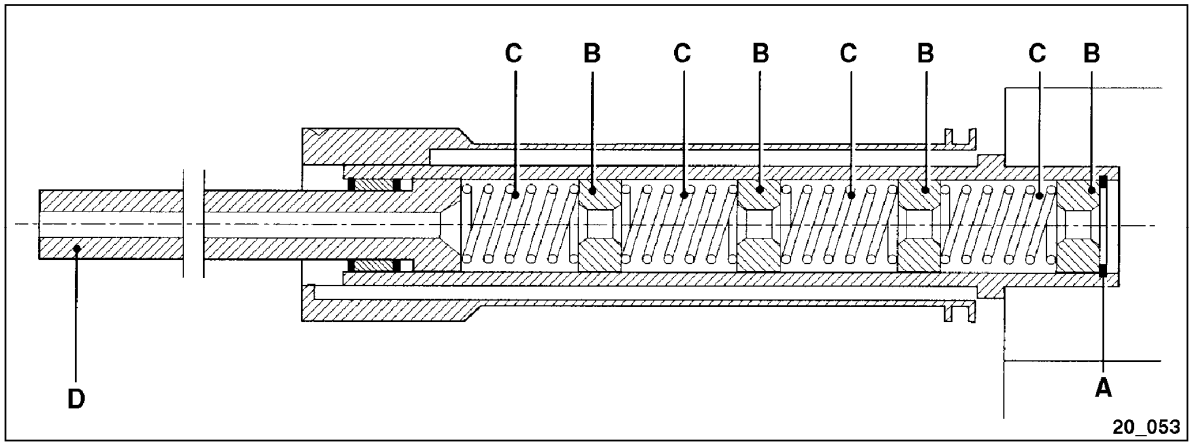
- Remove the internal sleeve.
- If necessary, remove the lathe spindle liner and install another one suitable for the diameter of the guide channel.



TELESCOPIC NOSE (STROKE 120/160)

When replacing the telescopic nose, it is not necessary to change completely the unit, but only some parts supplied with the spare parts kit.

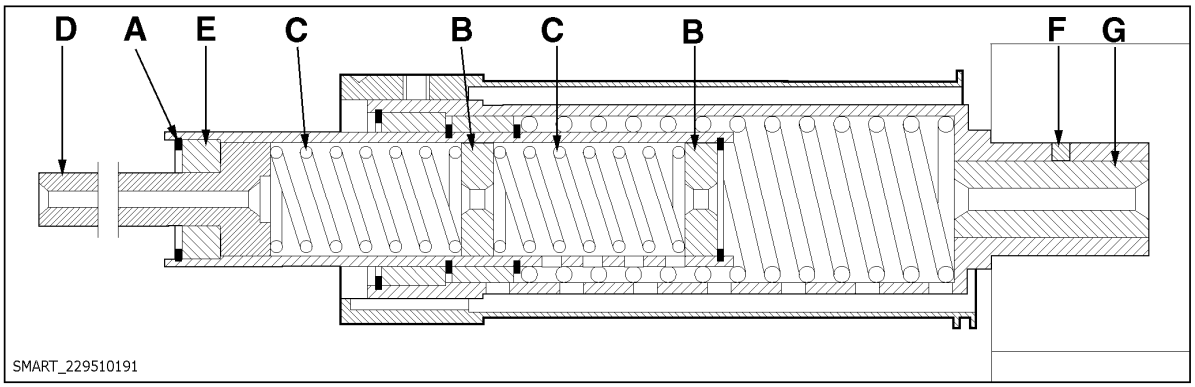
- Remove the sleeve from its housing.
- Remove ring (A).
- Remove bushes (B), springs (C) and sleeve (D).
- Reassemble sleeve (D), bushes (B) and springs (C). The sleeve and the bushes should have the same diameter as the guide channel.



TELESCOPIC NOSE (STROKE 170/220/320)

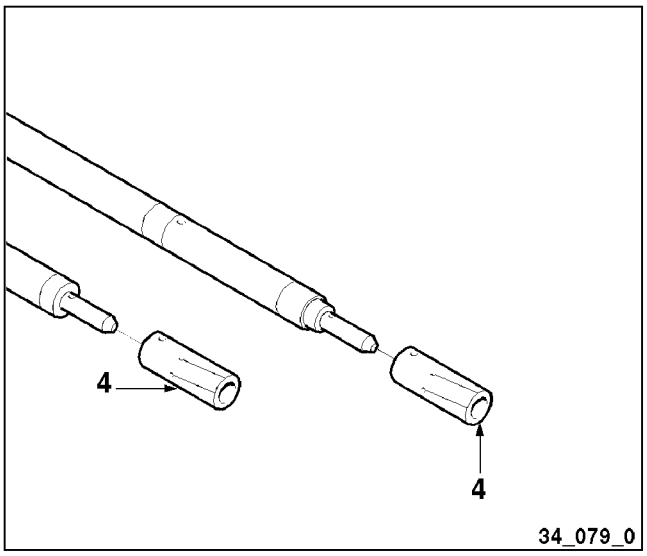
When replacing the telescopic nose, it is not necessary to change completely the unit, but only some parts supplied with the spare parts kit.

- Remove the sleeve from its housing.
- Remove ring (A).
- Remove bush (E), sleeve (D), springs (C) and bushes (B).
- Reinstall bushes (B), springs (C) and sleeve (D). The sleeve and the bushes should have the same diameter as the guide channel.
  Put back in place bush (E), its substitution depends on the external diameter of sleeve (D).
  Reassemble ring (A).
- Loosen the screw (F) and remove the ring (G), replace it with another ring suitable for the bar. For max. diameter guides do not install ring (G).



- Choose the right collet for the bar; refer to the "GUIDE CHANNELS - BAR PUSHERS - REVOLVING TIPS - COLLETS" selection chapter.

INFORMATION:
contact IEMCA service department for further information.

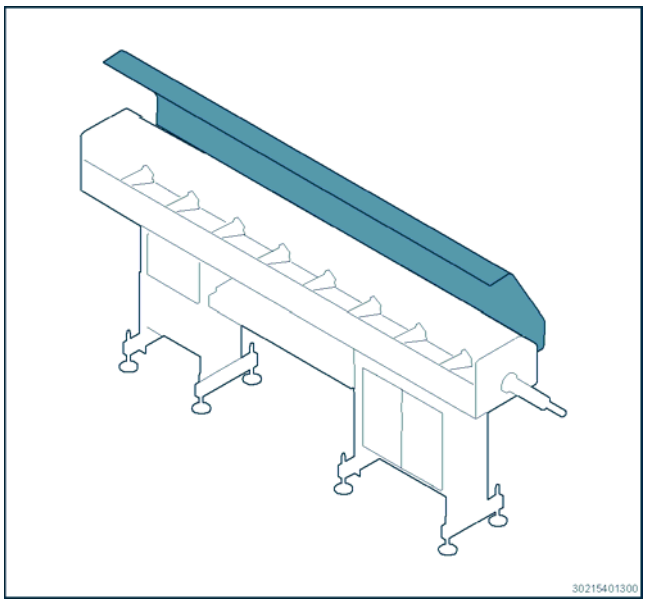


Legend:
4 Quick coupling collet for bars

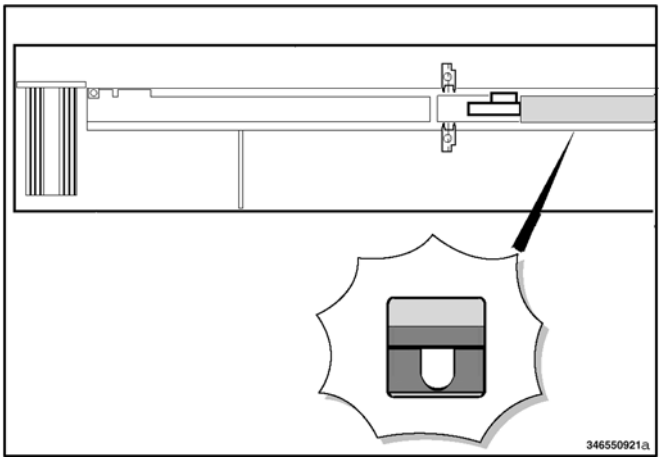
5.3.2 Bar guide plates - Adjustment

Preliminary procedure

- Remove the upper guard.

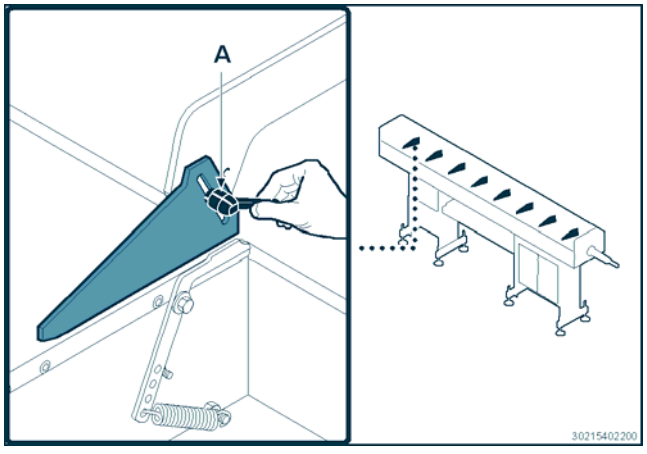


- Close the upper guide channel by pressing  on the keyboard (before the guard opening) or the key on the solenoid valve for guide channel opening/closing.

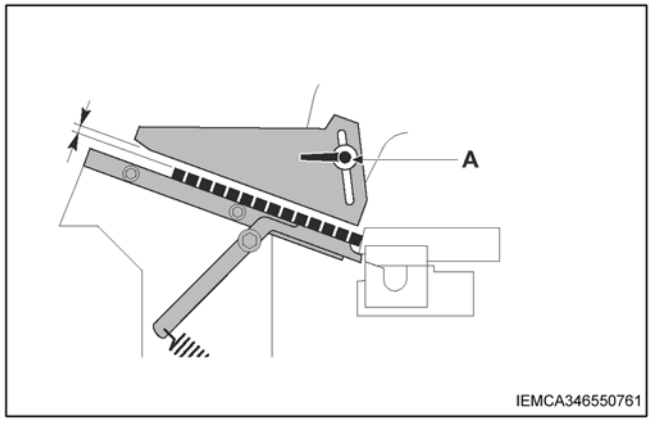


Bar guide plate adjustment

- Loosen the handle (A), lift the plate and tighten the handle (A); repeat this operation on all the plates.
- Prepare two bar remnants at least 1,200 mm long.
- Load the two bars into the magazine, loosen the handle (A) and let the plates drop against the bars.



- Make sure that a little clearance is left between the plate and the bars.
- Tighten the screws (A) on all plates.



5.3.3 BAR PUSHER REPLACEMENT PROCEDURE

WARNING - CAUTION

Do not absolutely perform the following procedure with a bar in the bar pusher collet!

The replacement of the bar pusher, for a working cycle change or maintenance, may be performed as follows:

- bring the bar pusher in manual mode MAN., with close guide channels;
- if the upper guide channel is open press +/-;
- press and hold down ● to start the automatic procedure which allows the bar feeder to move to the appropriate condition for the bar pusher replacement.

  by pressing ●, the bar pusher is positioned past the clamp device and the guide channels open;
- remove the bar pusher

INFORMATION

If during the abovementioned operations ● is released, the procedure will stop. By pressing the button again, the procedure will start from where it had stopped.

NEW BAR PUSHER INTRODUCTION

- Assemble a new bar pusher and press 
- Bring the bar pusher to zero axis position.

WARNING - CAUTION

Check if the bar pusher has been correctly introduced into the first feeding carriage housing.

On the contrary, proceed to zero axis sensor adjustment.

- Close the bar feeder guard, restore the start button 

and enter the manual mode 

.
- Restore the working cycle of the bar feeder.

5.4 CAM BOX - TIMING

If the feeder is equipped with a cam box, each cam should be timed to its own microswitch. The timing procedure is as follows.

MICROSWITCH FUNCTION

S90 - Bar feed enabling signal
It controls the bar feeding motor start/stop. It must be operated at each collet opening. In addition, it also controls operation of the bar/headstock synchronizing device.

S91 - Bar change enabling
It signals lathe collet opening/closing to the feeder.
It determines the camshaft stop position at bar end.

S92 - Feed stop enabling
Only used in sliding headstock lathes. It disables the feed thrust during any operations requiring headstock return with a closed collet.

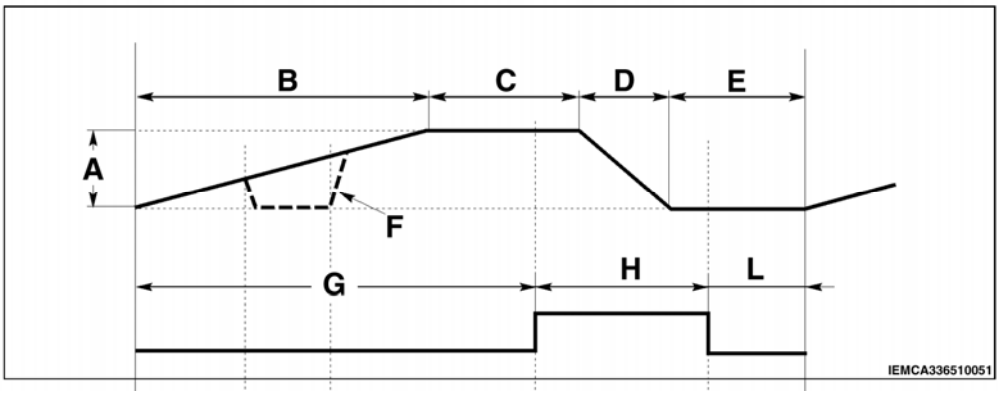
S99 - Camshaft stop
It determines the camshaft stop position when there is no thread (connected in series with a microswitch or relay located on the lathe).

CAM TIMING

LATHE CAM COMPLETE CYCLE

PHASE HEADSTOCK

PHASE COLLET LATHE

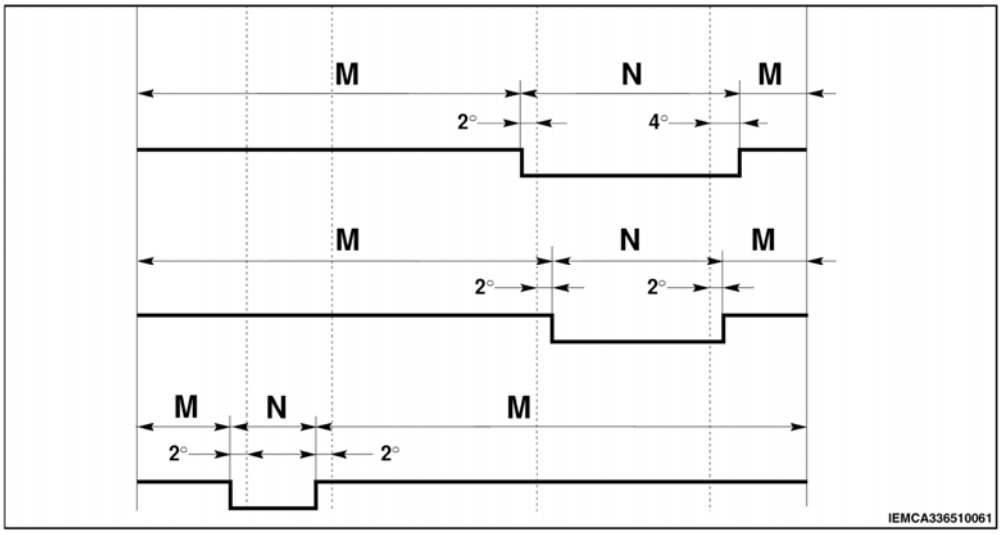


BAR FEEDER CAM COMPLETE CYCLE

PHASE MICROSWITCH S90

PHASE MICROSWITCH S91

PHASE MICROSWITCH S92



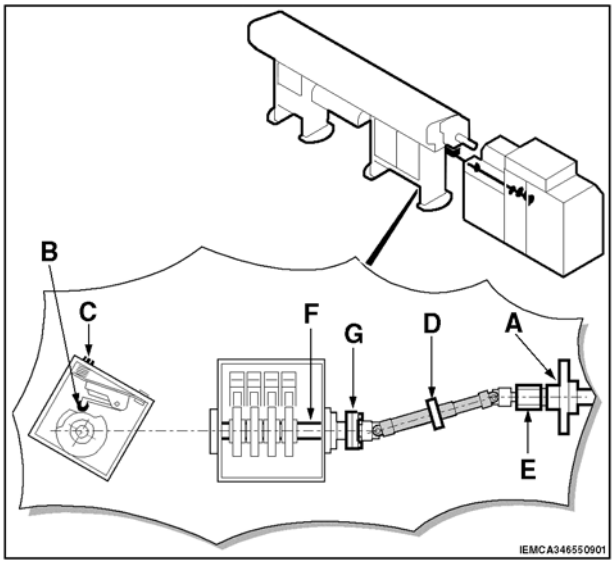
A STROKE
B FEEDING
C FORWARD STOP
D RETURN
E BACKWARD STOP
F Possible headstock return with closed collet for special operations
G CLOSED
H OPEN
L CLOSED
M DISABLED
N DISABLED

Microswitches “S90” and “S91”

- Rotate manually shaft (A) up to a distance of 10° approx. from the collet opening, then “S90” microswitch cam until wheel (B) is released.
- Turn shaft (A) until the collet opens.
- Turn "S91" microswitch cam to release the wheel.
- Rotate shaft (A) until the collet closes.
- Turn the cam to lift "S91" microswitch wheel.
- Rotate shaft (A) of 10° approx., then lift the “S90” microswitch wheel.

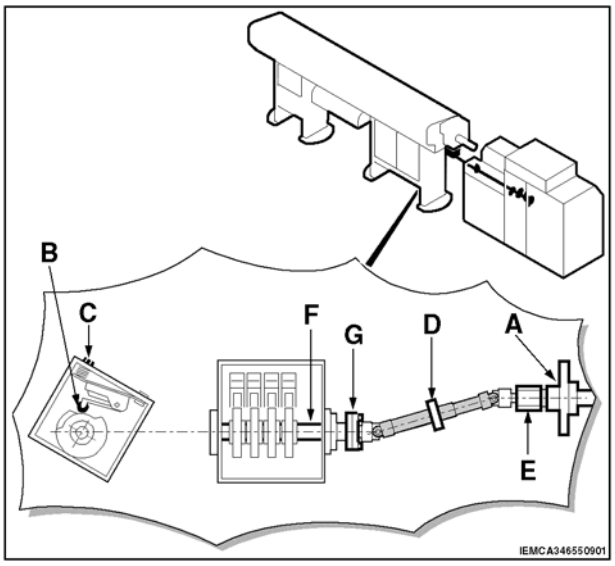
INFORMATION:

"S90" and "S91" microswitch wheels must lower when the headstock is in a forward position and lift when the headstock is backwards, in any case before the following feeding.



Microswitch “S92”

- Rotate manually shaft (A) until the headstock starts its return stroke with closed collet.
- Release the "S92" microswitch wheel.
- Continue rotation until the headstock has completed its return stroke.
- Lift wheel "S92".



Microswitch “S99”

When the threading tool starts its return stroke, lower "S99" microswitch wheel and lift it before the stroke is over.
Should microswitch "S99" be fitted on lathe, timing is to be performed on lathe cam.

GENERAL REMARKS

- Microswitch activation can be either delayed or advanced through screw (C).
- Whenever servicing the camshaft, disconnect the cam box, according to the following procedure:
  - loosen clamp (D) and unscrew sleeve (E);
  - service the lathe camshaft;
  - screw sleeve (E) and tighten clamp (D);
  - should shaft (F) be out of phase, loosen sleeve (G) screws, rotate it and tighten the screws.

INDEX

6.1 CONTROL DESCRIPTION

INFORMATION:

From the keyboard it is possible to start the bar feeder in automatic mode, even when lathe 'MAN/AUT' signal is in Manual mode.

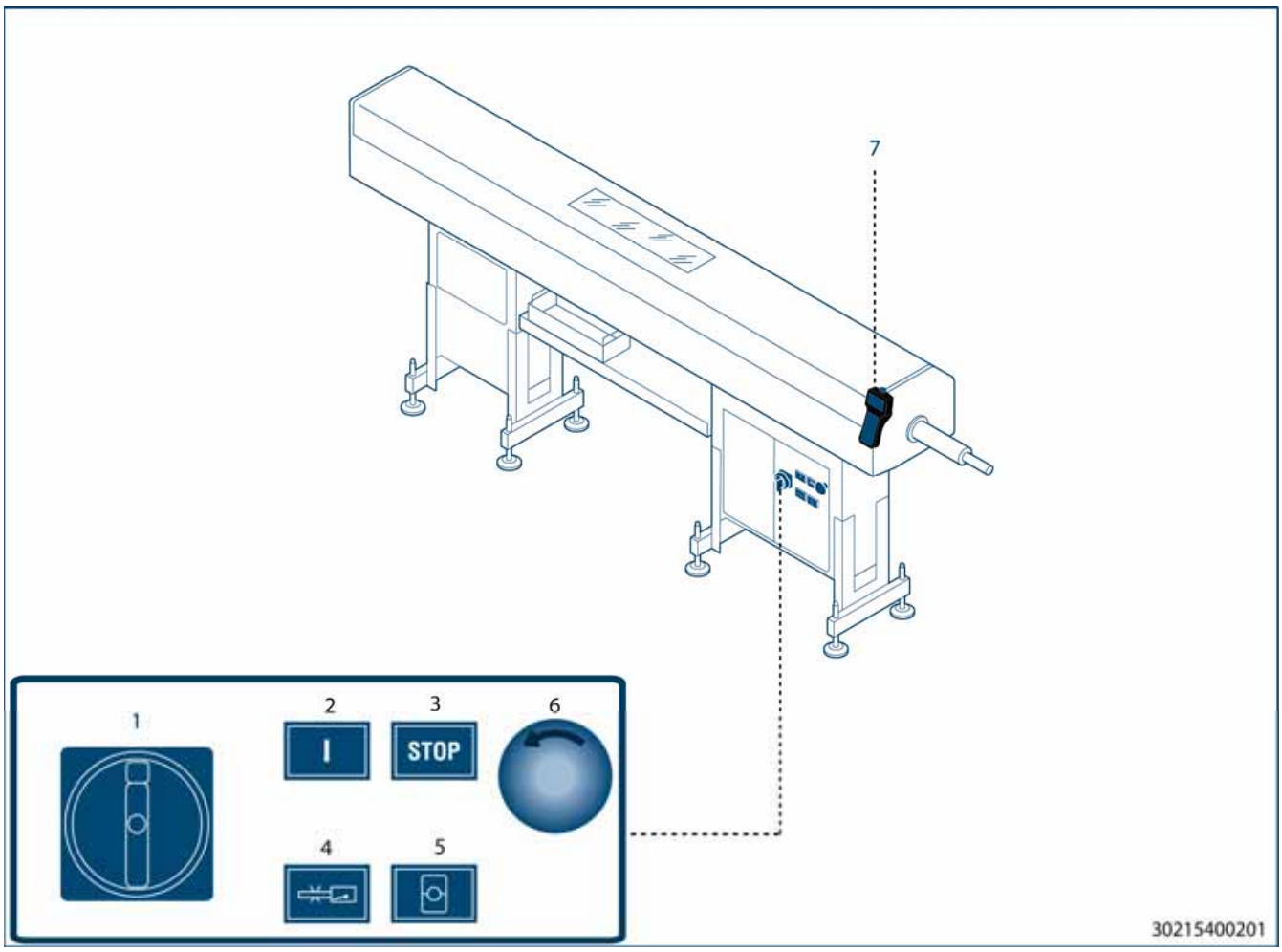
INFORMATION:

When the bar feeder is in Automatic mode, the bar feeding is possible only when the Lathe 'MAN/AUT' signal is in Automatic mode.

INFORMATION:

By pressing the Manual mode button it is possible to prevent the lathe from starting the bar feeder in automatic mode.

The illustration shows the position of the electrical controls and the keyboard controls.



1 MAIN SWITCH: turns the power supply on and off.
- Position 0 (OFF) the machine is not powered.
- Position I (ON) the machine is powered.

2 BAR FEEDER START BUTTON (green light): press the button to start the bar feeder and hold it down until the button lights up.

3 BAR FEEDER STOP BUTTON (red light): press this button to stop the bar feeder and reset the "Errors".

4 BAR/REMNANT DETECTION DISABLING BUTTON (green)
Press the button to disable the new bar and remnant detection in automatic mode.

5 HALF-BUSH OPENING AND CLOSING BUTTON (white light)
- In "Manual" mode, when the bar feeder is in the required position, the half-bushes will close when this button is pressed. If pushed again, the half-bush will open.
- In "Automatic" mode, if pressed, the half-bushes will open and close, according to the selected sequence. If pressed again, the half-bushes will remain open during the entire operating cycle.

6 EMERGENCY STOP PUSH-BUTTON: stops the bar feeder in case of emergency. For restart release the push-button manually.
7 KEYBOARD: display and main controls.

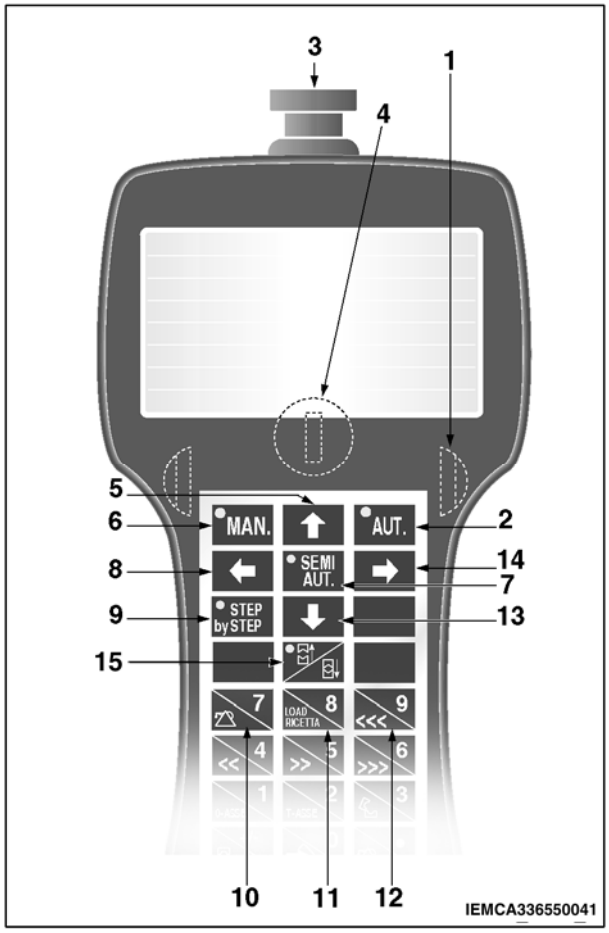
6.2 KEYBOARD CONTROL DESCRIPTION

1 Start buttons: opposite buttons enabling the keys for some functions. Press both buttons and simultaneously the button corresponding to the desired function.
2 Selects the automatic function.
3 It stops the bar feeder: for restart, manually release the push-button.
4 SELECTS KEYBOARD MODE:
- in the position selects the "message display" mode.
- in position selects the "Main Menu display" mode.

5 Multifunction
- Allows scrolling the page upwards.
- Moves the selection cursor upwards.

6 Selects the manual function.
Sets the numerical value.
7 Selects the semiautomatic function.
Press the button to select a mode and press again to deselect it.
8 Multifunction
- Selects the previous parameter.
- Moves the selection cursor leftwards.

9 Activates the "step by step" operating cycle: every time the button is pressed one step is performed.



10 Multifunction
- Sets the numerical value.
- Turns on/off the oil pump.
  Press to turn on the pump and press again to turn it off.

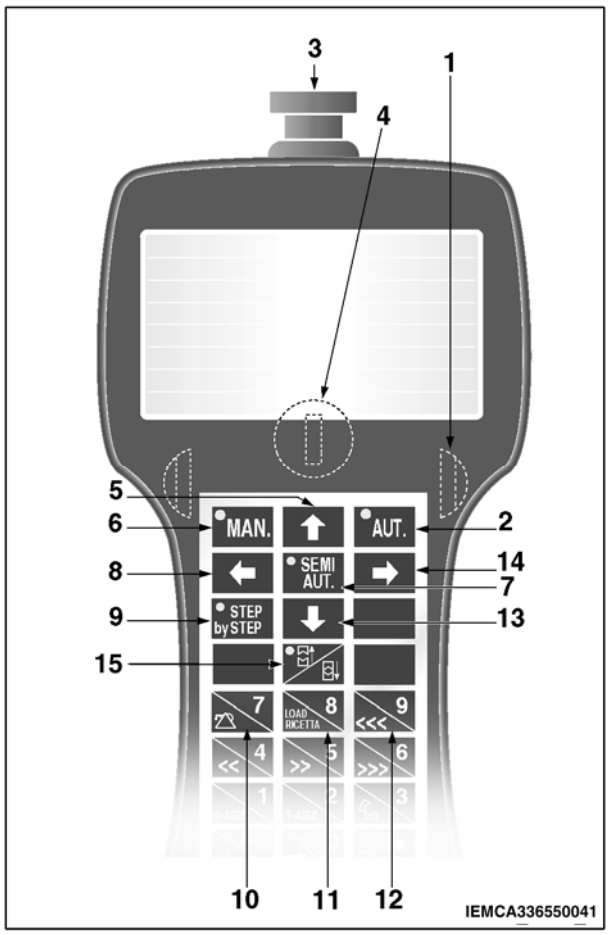
11 Multifunction
- Sets the numerical value.
- Loads the program from the PLC (entering default values in the parameters)

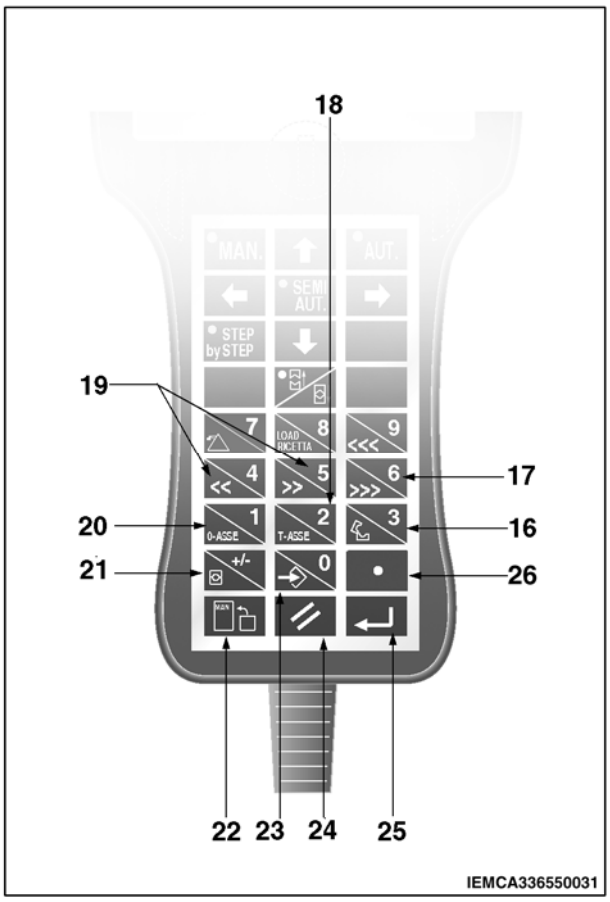
12 Multifunction
- Moves the bar pusher fast in manual mode.
- Sets the numerical value.

13 Multifunction
- Allows scrolling the page downwards.
- Moves the selection cursor downwards.

14 Multifunction
- Selects the previous parameter.
- Moves the selection cursor rightwards.

15 Opens and closes the clamps in manual mode.
  Press to close and press again to open.





16 Multifunction
- Opens the guide channels in manual mode.
- Sets the numerical value.

17 Multifunction
- Moves the bar pusher fast in manual mode.
- Sets the numerical value.

18 Multifunction
- Calibrates the carriage displacement motor.
- Axis calibration procedure description.
- Sets the numerical value.

19 Multifunction
- Sets the numerical value.
- Moves the bar pusher at a low speed.

20 Multifunction
- Resets the "BAR FEEDER ZERO SETTING" of the carriage.
- Calibrates the carriage displacement motor.
- Axis calibration procedure description.
- Sets the numerical value.

21 Multifunction
- Closes the guide channels in manual mode.
- Sets the sign in a numeric field.
- Displays the program identification data.

23 Multifunction
- Sets the numerical value.
- Recalls the selection cursor.

24 Multifunction
- Stops the selection function.
- Restores the value prior to the non-confirmed modification.

25 Confirms the entered data.

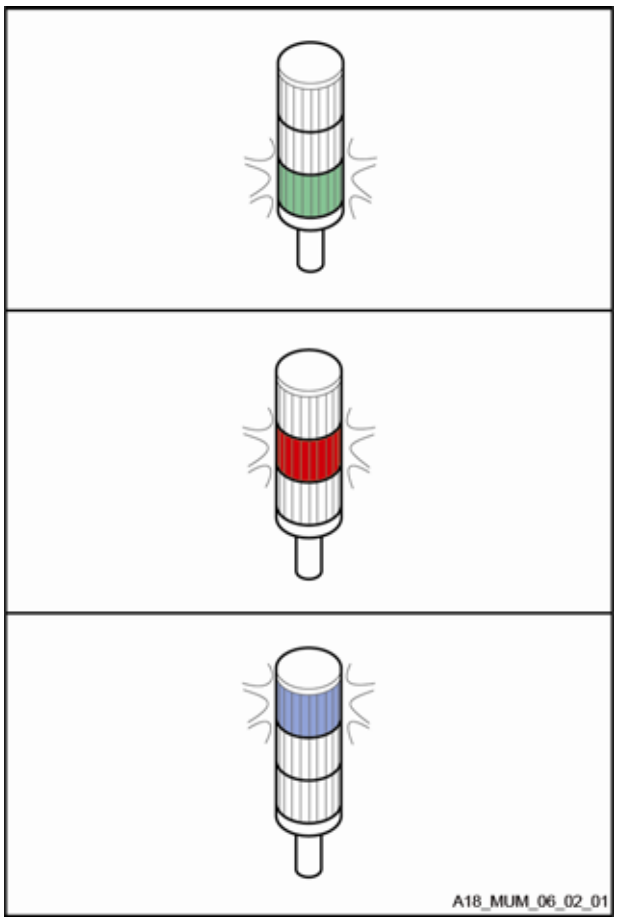
26 Sets the comma.

6.3 LIGHT INDICATOR DESCRIPTION

Green light (OPT): signals that the bar feeder is working in automatic mode.

Red light (OPT): signals that the bar feeder is in stopping conditions, or that it is working in manual mode.

Blinking blue light (OPT): indicates that the bar feeder is carrying out the bar change.



6.4 BARS TO BE MACHINED - FEATURES AND PREPARATION

WARNING – CAUTION:

do not load bars having sizes different from those recommended by the manufacturer (see reference table in § Chap. 5).

Clean the bar surface before loading bars.

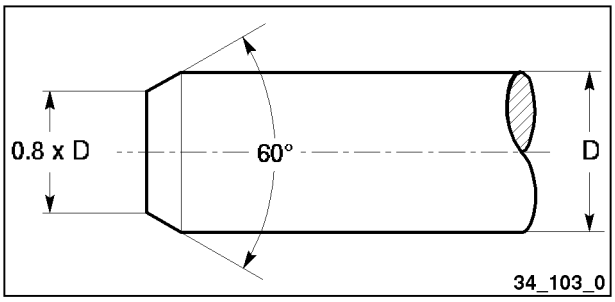
INFORMATION:

the bar must not have a straightness defect above 0.5 per 1,000.

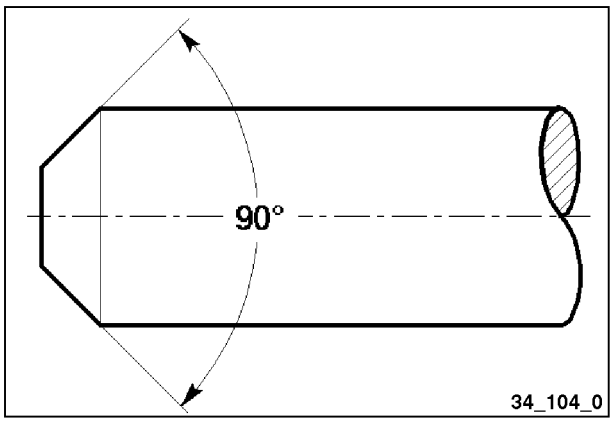
Please find hereafter some advices to optimise the bar feeder performances.
Usually it is not necessary to perform preliminary operations on the bar ends, but to obtain optimum results during loading, it is advisable to chamfer them.

6.4.1 BARS TO BE MACHINED – LOADED BARS

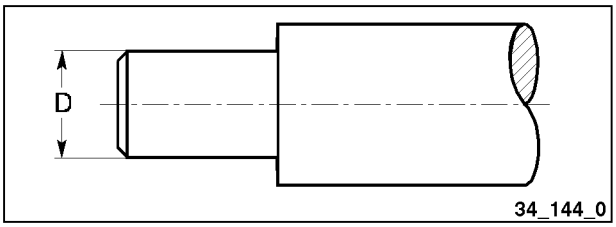
Make sure that there is no rag on the fore end, which might hinder the lathe collet entering.
The bar rear end must be chamfered as indicated in the figure.



If bars with front remnant ejection have to be machined, we advise to chamfer the bar rear end as shown in the figure.

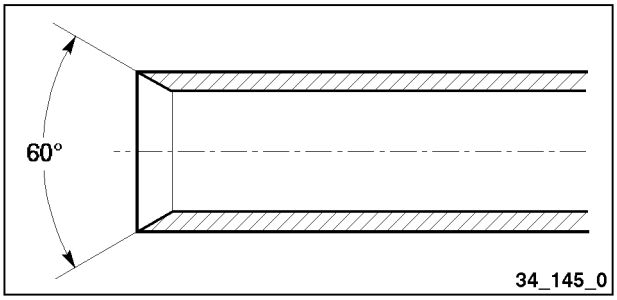


When machining bars having a diameter equal to or only slightly smaller than the bar pusher diameter, it is necessary to turn the bar rear ends; diameter (D) should be suitable for the collet installed in the bar pusher.



6.4.2 BARS TO BE MACHINED - PIPES

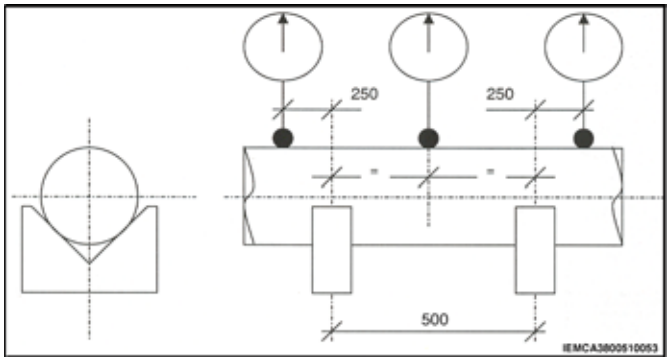
If pipes are to be machined, the rear end of the pipe must be chamfered as shown in the figure.



6.4.3 BAR STRAIGHTNESS - Measurement

The bar vibrations are partially due to the state of the bar itself: if the bar is not perfectly straight, it can cause vibrations.

Round bars
As stated also in the UNI-10233/2 regulation, the bar straightness can be measured by positioning the bar on two V-supports and controlling its straightness. In that case, the measurement can be carried out as shown in the figure.
It is necessary to rotate the bar on itself and measure the three indicated sections. In this case, the S-max value (difference between maximum and minimum value on the comparator) should be interpreted as follows:



S max	Quality
< 0,25 mm	Good
0,25 < S max < 0,5 mm	Average
> 0,5 mm	Problematic

In order to obtain a reliable value it is necessary to repeat the measurements on the whole bar length by positioning it on a series of supports at a distance of 500 mm from each other and comparing the values between the different prisms.

INFORMATION:

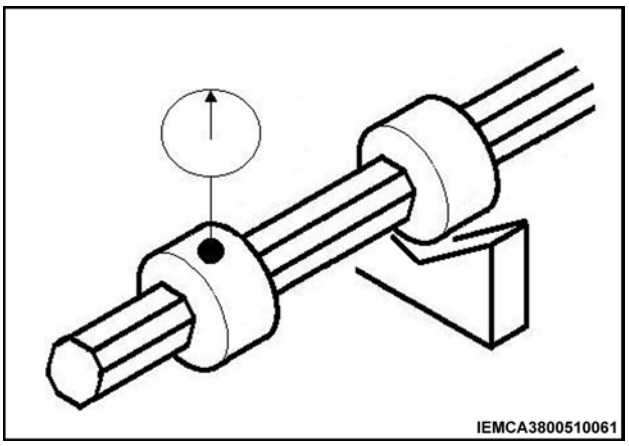
The straightness of the rotating bar is proportional to the rigidity of the material and to the number of revolutions (RPM) at which the lathe must operate. The lack of bar straightness highly influences the maximum number of revolutions that may be reached: the bigger the diameter the greater the influence. The data concerning the bar linearity or straightness refer to the bar constant bending and not to the localized inflection and/or deformation that the bar shall not absolutely show.

INFORMATION:

For a correct operation of the bar feeder do not use rolled material.

Hexagonal, square and section bars

With shaped bars, insert some bushings on the bar to be controlled.
Position 2 bushings on both V-supports.
In that case, the measurement can be carried out as shown in the figure.
Rotate the bar on itself and carry out the measurement on a bushing external to both V-supports.



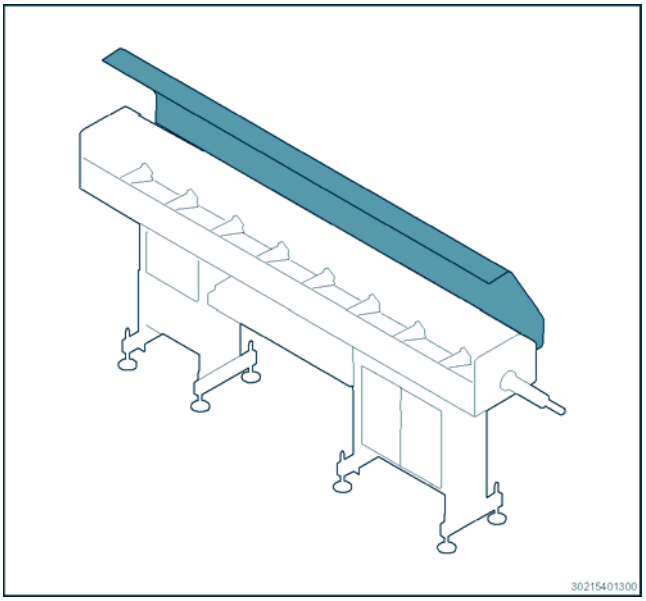
6.5 BAR FEEDER SET-UP AND AUTOMATIC CYCLE START

The following list is a sequence of feeder set-up and automatic cycle start operations required if the feeder has to be started up for the first time.

- Perform the software parameterization (refer to the "Keyboard Instruction Manual")
- Set up according to the bar to be machined (§ "Setup according to the bar to be machined" Chap 5.)
- Prepare the bars to be machined (§ "Bars to be machined – features and preparation" Chap 6).
- Fill the bar magazine (§ “Bar magazine – filling”, Chap. 6).
- Adjust the lubricating oil flow (§ "Lubricating oil – flow regulation" Chap 6).
- Start the automatic cycle (§ "Automatic cycle start" Chap 6).

6.5.1 Bar magazine - Filling

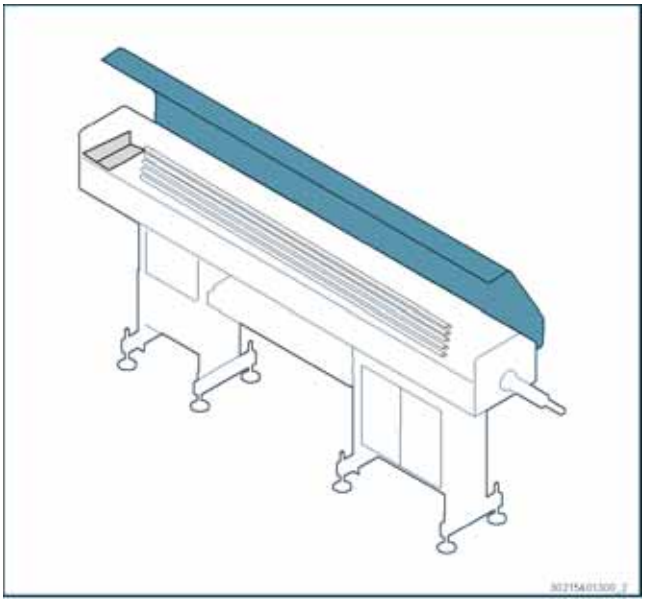
WARNING – CAUTION:
do not manually lift loads with weights exceeding those foreseen by the applicable regulations in force; if necessary use a suitable lifting device.



WARNING – CAUTION:
wear personal protections according to the regulations in force.

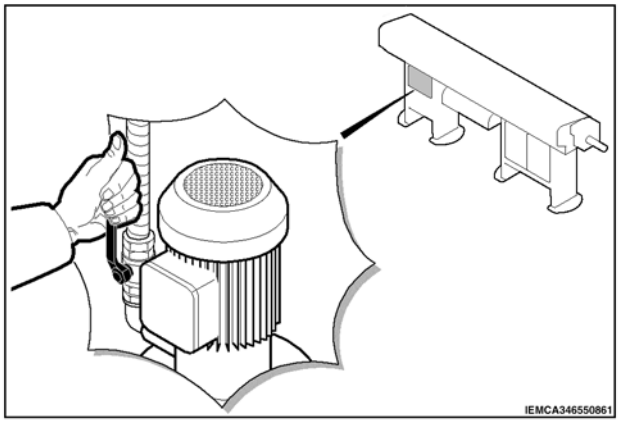
Follow these instructions to load bars:
- make sure the guide channels are closed;
- open the upper guard;

- position the bars against guard (A) and close the upper guard.

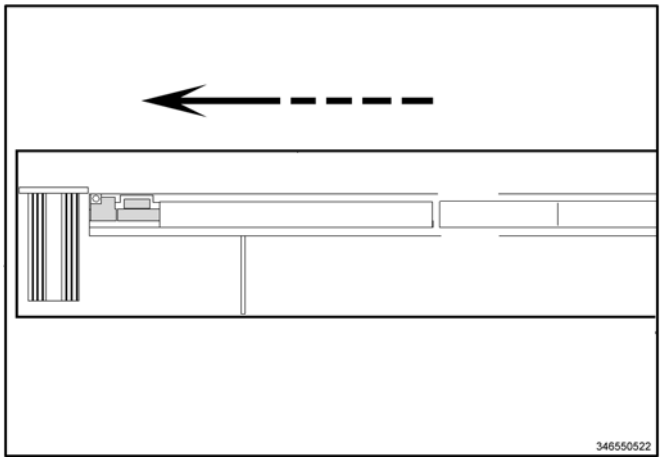


6.5.2 Lubrication oil - Flow adjustment

Oil flow in the guides is automatically controlled during the feeder automatic cycle.
The pump is started when the bar feeder has completed the bar change and stops when the bar pusher approaches the bush holder device.
Oil flow should be adjusted according to bar diameter and profile through the valve placed upstream.



6.5.3 Automatic cycle start



- Power the lathe on.
- Turn the main switch to position I (ON).
- Press  to start the bar feeder.
- Press  , to select the manual mode.
- If the bar pusher has been moved while power supply was disconnected, the bar feeder zero setting should be performed when turning the machine on again, as follows:
- with upper guide channels closed or open, press 

IF THE BAR-PUSHER HAS NOT BEEN MOVED WHILE POWER SUPPLY WAS DISCONNECTED, "ZERO AXIS" CONTROL HAS NOT TO BE PERFORMED WHEN POWERING THE MACHINE AGAIN.

After carrying out the above-mentioned operations, perform next step:

- Enter the parameter values (refer to the "Keyboard Instruction Manual").
- Press the manual feed button to bring the bar fore end near the cutting tool.

  To start machining, press  , when the lathe collet is closed. From now on, you will obtain automatic bar feeding until bars are ended or according to the set program.
- During machining, empty the remnant recovery box. Remove the box after lifting it over the tank edge.

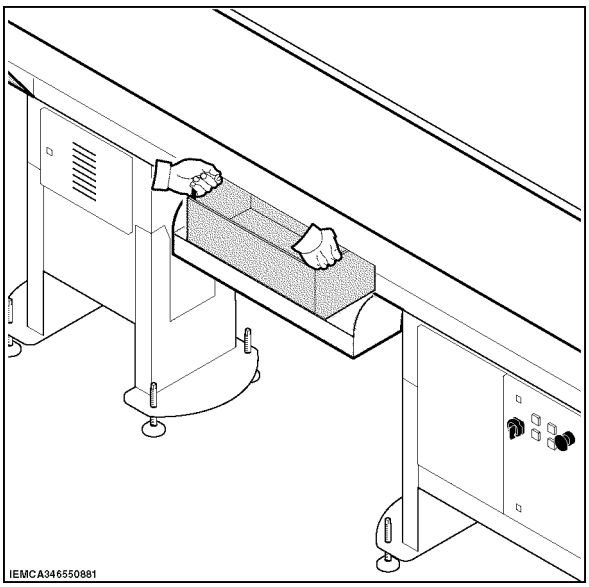
 ***WARNING – CAUTION:***

do not manually lift loads with weights exceeding those foreseen by the applicable regulations in force.

WARNING – CAUTION:
keep hands out of remnant drop area after the remnant box has been pulled off.

WARNING – CAUTION:
wear personal protections according to the regulations in force.

Place the box back under the remnant outlet.



6.5.4 Guide channel opening/closing procedure

The following instructions concern guide channel opening and closing in the manual function.

OPENING PROCEDURE

By pressing 

with upper guide channels closed, the display will show:

To open the guide channels follow the instructions at paragraph 6.4.5: step by step cycle performing operations.
If the guide channels are in an intermediate position (upper guide channels not close nor open), press 

to open them completely.

CLOSING PROCEDURE

If the upper guide channels are open and the first feeding carriage is shifted from its “ZERO AXIS” position by pressing 

, the display will show:

move the carriage to “ZERO AXIS” position, by pressing the manual return key.

As soon as the carriage reaches this position, the following message will be displayed:

Close the guide channels by pressing 

.

6.5.5 Mode of performing a cycle in the STEP BY STEP function

Foreword

This mode may be used for many reasons, as for instance:

- to open the guide channels;
- to check a complete bar change cycle;
- to check the bar feeder mechanics;
- to load a single bar so as to check the facing;
- et cetera.

Procedure

1 press  to start the bar feeder;

- check that the guide channels of the bar feeder are closed. If not, close the guide channels in manual mode.

2 press  then  to select the semiautomatic mode;

3. press  , the bar feeder performs the first step (bar pusher return);

4 press  , the bar feeder performs the second step, and so on.

6.6 BAR FEEDER STOP

BAR FEEDER EMERGENCY STOP

WARNING – CAUTION:

if the emergency stop is activated whilst the lathe is working, before restarting the working cycle, check that no dangerous conditions have been created due to the sudden stop.

Example: if the tool was removing chips, before restarting the lathe, distance the tool from the piece.

- To stop the bar feeder in emergency, press one of the emergency buttons of the bar feeder or lathe.

BAR FEEDER STOP AT THE WORKING CYCLE END

WARNING – CAUTION:

when stopping the machine normally, do not use the emergency buttons.

- Complete the operations in your working schedule.
- Stop the bar feeder by pressing STOP.
- Stop the lathe.
- Turn the main power switch to O (OFF).

6.7 AXIS CALIBRATION PROCEDURE

Foreword:

This procedure is aimed at optimizing the movements of the bar feeder axis. This procedure should not be performed daily but rather occasionally (recommended time: once a month) to compensate any wear of the mechanical feeding units that could alter the AXIS control operations.

Procedure:

Move the feeding carriage from its completely backwards position in manual mode MAN., then simultaneously press  and  for at least two seconds, until Offset appears on the display. Now the operator may release the keys.

INFORMATION:

Before performing the following procedure make sure that the mechanics have no clearances (e.g.: feeding chain not tensioned properly) and that the zero axis sensor is positioned correctly (make sure it is not too retracted).

6.8 MACHINING CHANGE - QUICK GUIDE

This paragraph aims at providing the operator with a quick guide of the operations to carry out in order to perform the machining change. In some cases, this can imply the guide channel change.
The relevant information is contained in the paragraphs listed below and then described.

6.8.1 Machining type change with guide channel change

- Select the diameter of the guide channels according to the bar to be machined (§ "Setup according to the bar to be machined" Chap 5).
- Replace the guide channels, the half bushes, the bar pusher and the collet (“Guide channels, half bushes, bar pusher and collet – Replacement”, Chap.5).

  - remove the bar pusher and the first feeding flag;
  - remove the lower guide channels;
  - remove the bar pusher supports;
  - remove the front nose;
  - adjust or, if necessary, disassemble the half bushes;
  - if necessary, remove the lathe spindle liner;
  - install a new set of parts by reversing the order of the above operations;
  - mount a collet suitable for the "new" bar in the bar pusher;
  - insert the bar pusher in the guide channels;

- Adjust the bar guide plates ("Bar guide plates - Adjustment", Chap 5).
- Check all the working parameters on the keyboard.
- Prepare the lathe for a new machining cycle.
- Start the automatic working cycle (§ "Automatic cycle start" Chap 6).

6.8.2 Machining type change without guide change

- Replace the collet (“Guide channels, half-bushes, bar pusher and collet – Replacement”, Chap.5)

  - adjust the half-bushes;
- Adjust the bar guide plates ("Bar guide plates - Adjustment", Chap 5).
- Check all the working parameters on the keyboard.
- Prepare the lathe for a new machining cycle.
- Start the automatic working cycle (§ "Automatic cycle start" Chap 6).

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7.1 MAINTENANCE – GENERAL RULES

DANGER - WARNING:
carry out the cleaning and maintenance operations when the bar feeder is off.

Regular cleaning and maintenance are essential to ensure a correct operation and a long bar feeder service life.
A regular and effective cleaning of the bar feeder, its accessories and working area, is recommended as it increases the operator safety as well.
Do not use petrol or solvents which would damage the painted and transparent parts, the cable sheaths etc.

INFORMATION:
oxidation can damage metal parts and electric equipment.

To protect the bar feeder during long inactivity periods, disconnect it from the mains voltage, remove the compressed air and cover it with a cloth of suitable material.
Any protection should not be completely closed or sealed at the base; it should be equipped with ventilation holes so as to ensure that humidity may not condense due to lack of circulation.

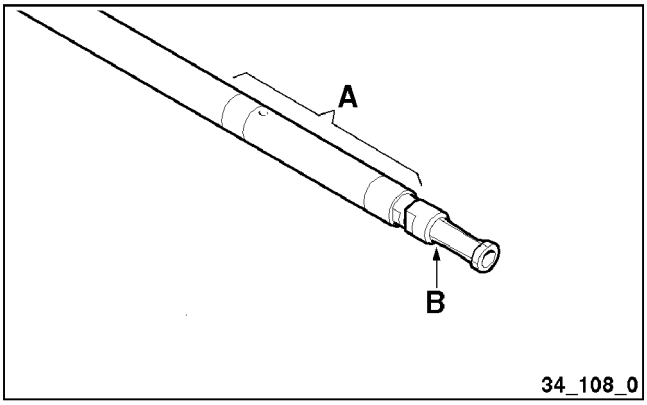
7.2 SCHEDULED MAINTENANCE

Scheduled maintenance

Machine section	Operation to be carried out	Frequency					
		Hours			Periodically	Every year	Cycles
		200	1250	2500			
Revolving tip and collet	Wear check	•					
Half-bushes	Wear check	•					
Lubrication system	Oil level check	•					
	Oil change			•			
Guide channels	Integrity and cleanness check		•				
Feeding chain	Lubrication	•					
	Tensioning check	•					
Air filter	Check				•		
PLC battery	Replacement					•	
Safety devices	Check efficiency (see "safety devices")	•					

7.2.1 Revolving tip and collet - Check

- Remove the bar pusher, as described in paragraph "Guide channels, half-bushes, bar pusher and collet - Replacement", Chap 5.
- Check that the revolving tip (A) can turn freely without excessive backlash.
  Also check that collet (B) is in good condition.

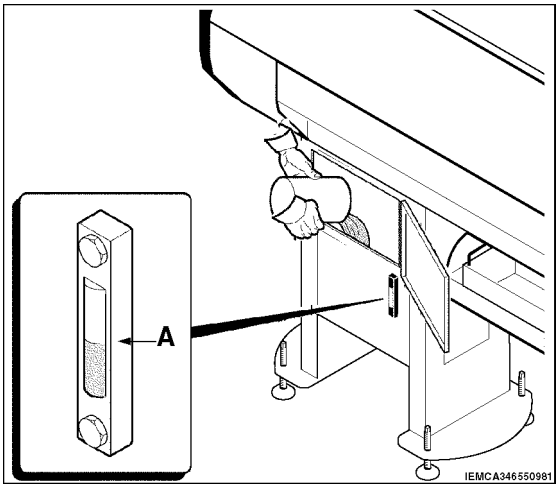


7.2.2 Lubricating oil - Level check

WARNING – CAUTION:
wear personal protections according to the regulations in force.

- Wait until the bar feeder has been off for at least 6 hours.
- Check the level by means of the indicator (A). Open the rear base door and pour oil into the machine to top up.

See § “Technical Data”, in Chap. 2, for the comparative table.



7.2.3 Lubricating oil - Change

WARNING – CAUTION:
wear personal protections according to the regulations in force.

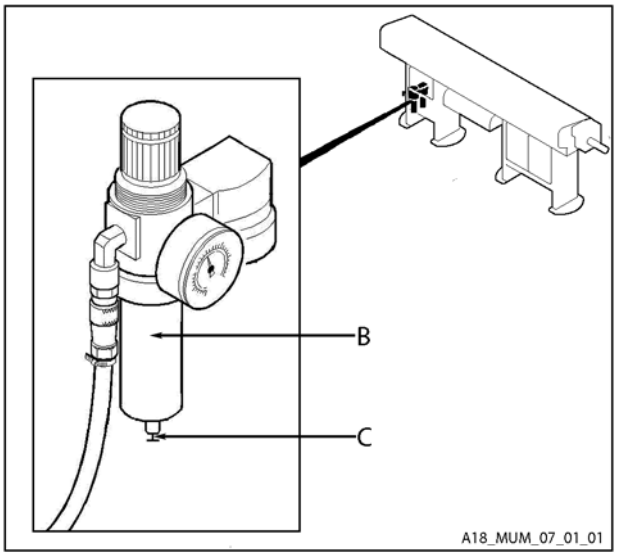
INFORMATION:
keep drain oil in suitable containers and deliver it to companies specialized in the storage and disposal of polluting waste products.
Avoid environmental pollution.

- Drain the tank using an auxiliary pump. Clean the tank bottom and the pump suction system.
- For the loading, pour the oil directly in the tank and check the level through the indicator (A).

See paragraph “Technical Data” in Chap. 2, for the comparative table and the required quantities.

7.2.4 Air filter unit - Check

FILTER A
- Make sure that cup (B) is not full of condensate. Drain the condensate by means of valve (C), if necessary.
- Check pressure switch adjustment, see paragraph "Pressure switch – Adjustment”, Chap. 5.



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8.1 GENERAL FAILURES

TROUBLES	CAUSES	SOLUTIONS
The bar feeder cannot start	[MOD20]	Check the electrical connection.
	Open guard.	Close the guard.
	Emergency devices on.	Disable the emergency devices.
	Motor thermal circuit breaker burnt.	Reset the motor thermal circuit breaker with the special buttons.
The bar feeder has been reset but the automatic cycle cannot start.	No lathe signal.	Check the electrical connection with the lathe.
The pneumatic devices do not respond to controls.	[MOD25]	Check the air system.
The first feeding and feeding are stopped unexpectedly.	Motor thermal circuit breaker burnt.	Reset the motor thermal circuit breaker with the special buttons.

8.2 BAR MAGAZINE – Failures

TROUBLES	CAUSES	SOLUTIONS
During the loading phase the bar cannot enter into the magazine	The bar alignement plates are too low	Adjust the position of the plates
The first bar in the magazine fails to drop into the guide channel	The bar alignement plates are not correctly adjusted.	Adjust the position of the plates

8.3 FEEDING INTO COLLET – Failures

TROUBLES	CAUSES	SOLUTIONS
The bar fails to enter into the collet	Collet diameter is not suitable for bar diameter	Replace the collet
	Excessive rag on bar fore end	Eliminate rag on bars before loading

8.4 BAR FEEDING - Failures

TROUBLES	CAUSES	SOLUTIONS
Difficult bar introduction into lathe spindle	Bar feeder not aligned with lathe	Check and correct alignment
Difficult bar introduction into lathe collet	Excessive rag on bar fore end	Eliminate rag on bars before loading

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9.1 FEEDING CHAIN – REPLACEMENT

The replacement of the feeding chain is a very complex operation; contact IEMCA service department.

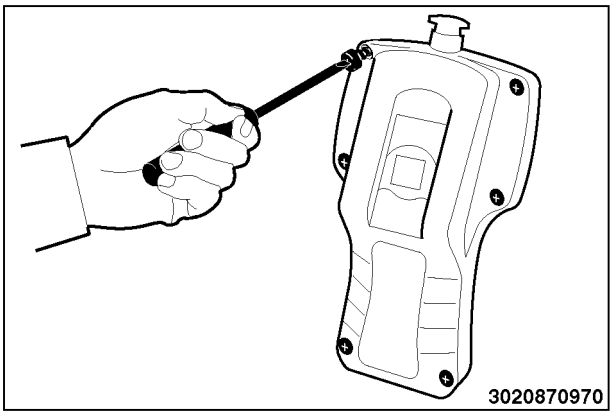
9.2 KEYBOARD BATTERY – REPLACEMENT

Replace the battery every year, or when the following message appears on the display "KEYBOARD BATTERY EXHAUSTED":

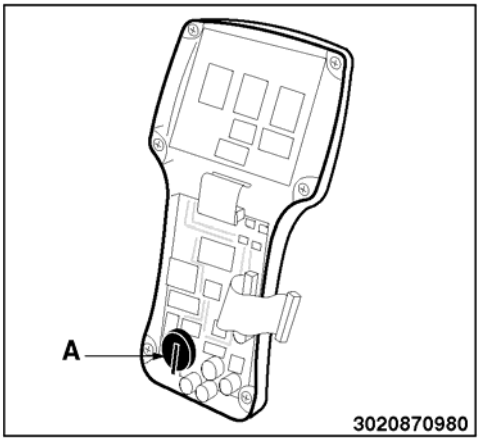
INFORMATION:

failure to replace the battery can cause the calendar - clock memory to be deleted.

- Turn off the electrical supply.
- Unscrew the six screws and remove the two half-shells.



- Remove battery A from its housing.
- Insert the new battery (DURACELL DL2430 type).



DANGER - WARNING:

danger of battery explosion if the battery is mounted with inverted polarity.

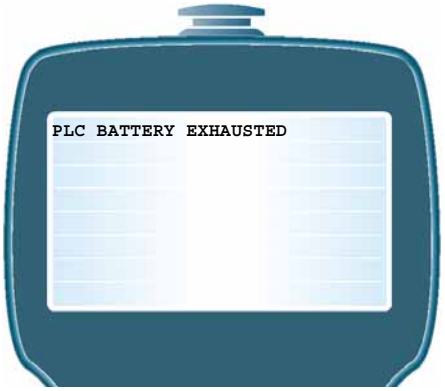
- Reassemble the two half-shells and screw the six screws.
- Reconnect the electrical supply.

INFORMATION:

Discard used batteries in appropriate waste containers. Avoid environment pollution.

9.3 PLC BATTERY – REPLACEMENT

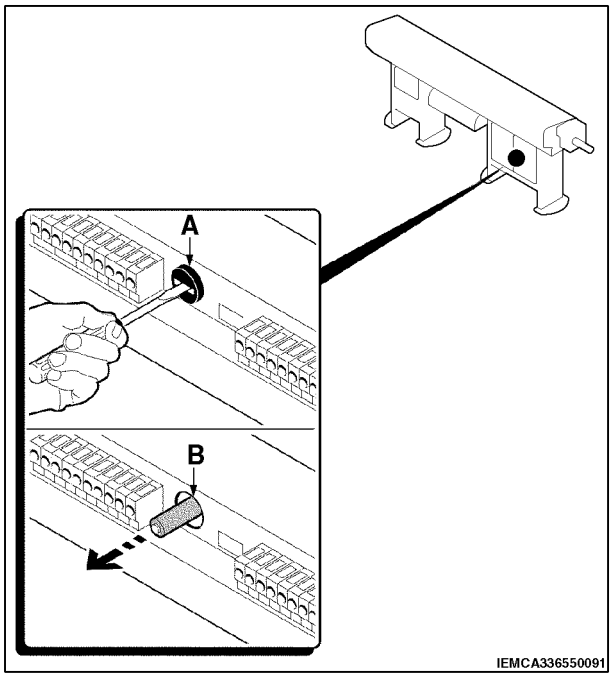
Replace the battery every year, or when the following message appears on the display: "PLC battery exhausted"



INFORMATION:

when this message is displayed, the battery should be replaced within one day, otherwise, the "PLC/NC Software" data will be deleted.

- unscrew plug (A) and remove battery (B);
- insert a new battery (3.6 volts lithium AA battery) and make sure that it is introduced correctly, then tighten the plug (A).



9.4 RECOMMENDED SPARE PARTS

The parts subject to wear or easily breakable parts are listed below (for a period of two years, normal use of the bar feeder).

For spare parts, please contact our Customer Service.

Model	Name	Features	Notes	Qty
SMART 320	Feeding chain			1
	Connecting link			1
	Limit switch	BERO 3RG4012-0AG33 SIEMENS		1
	Limit switch	BERO 3RG4012-0AG07 SIEMENS		3
	Bar pusher		Specify diameter and length	1
	Revolving tip		Specify diameter	1
	Collet		Specify inside and outside diameter	1
	Battery	Stack 3 Volt VARTA CR2032	handheld and fixed keyboard	1
	Battery	Stack 3,6 Volt	For PLC Arteco	1

9.5 Machine dismantling

This operation is to be carried out by expert operators, according to the safety at work regulations in force.
Do not throw non-biodegradable products, lubricating oils and non-ferrous components (rubber, PVC, resins, etc.) in the environment.
Dispose of the same according to the regulations in force.

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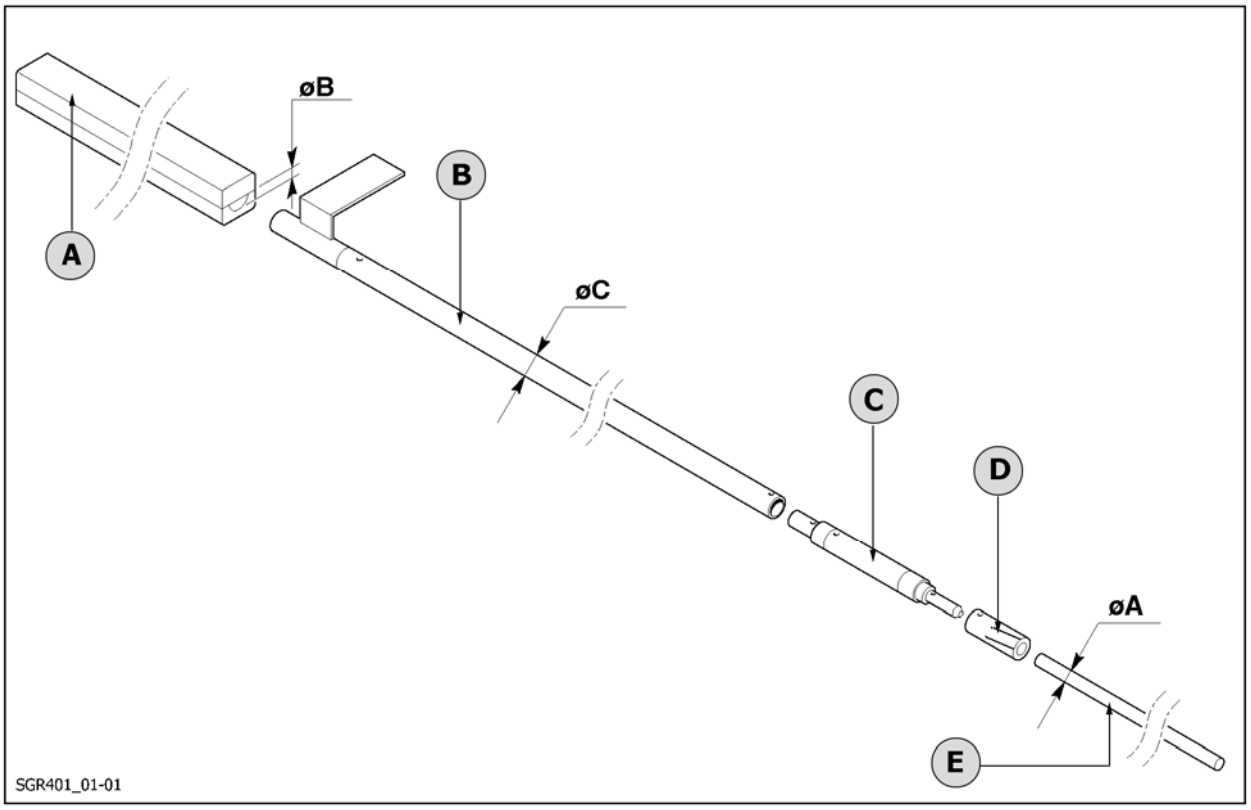
10.1 GUIDE CHANNELS AND BAR PUSHER - TABLE

The choice of the guide channels and the bar pusher must be made according to the diameter of the bar to be machined. The bar feeder is usually supplied with a bar pusher whose diameter is equal to the maximum bar passage of the lathe. Sometimes, in order to ensure the best working conditions, the use of a bar pusher with a smaller diameter may be necessary.



A Guide channels
B Bar pusher
C Revolving tip
D Collet
E Bar

WARNING – CAUTION:

the application field of the collets for machining specific bar diameters in the guide channels are indicated in the table in paragraph "SETUP ACCORDING TO THE BAR TO BE MACHINED", Chap.5.

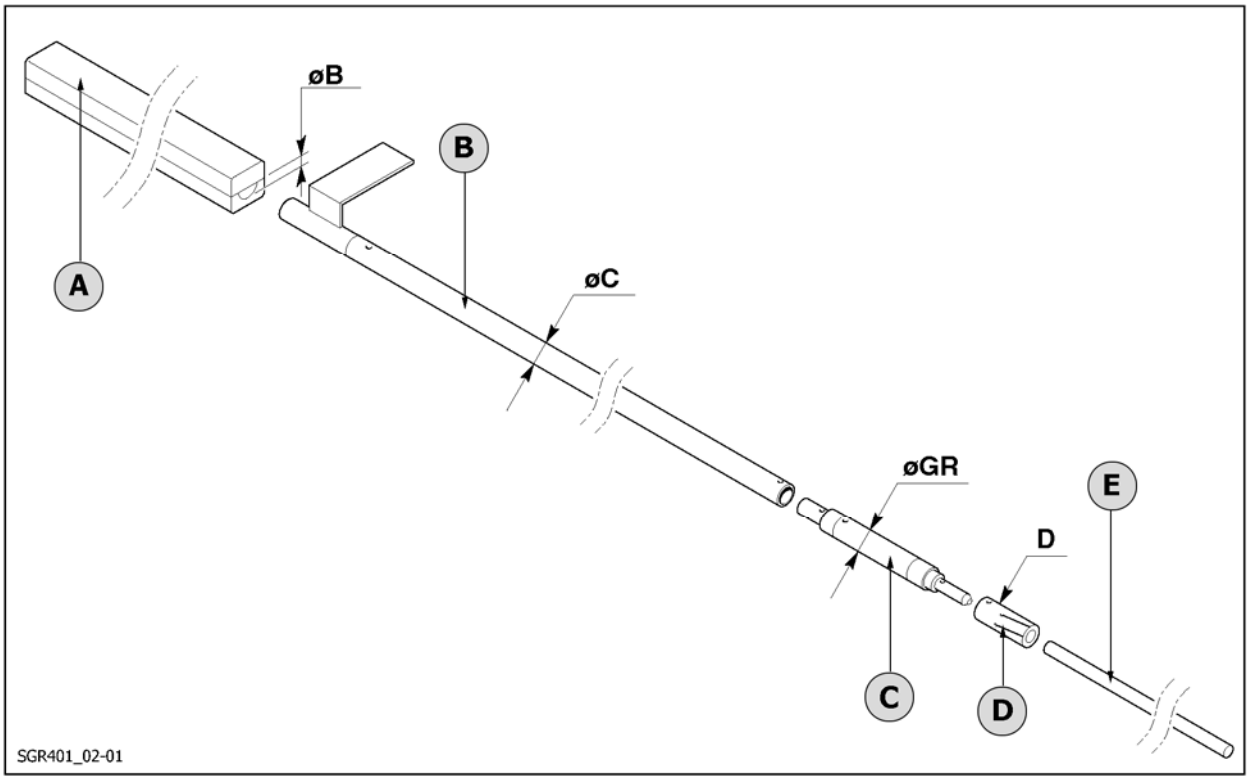
A bar diameter approximately 5 mm smaller than the guide channel diameter may cause vibration and failure to the bar feeder. Therefore, it may be necessary to slow down the bar rotation speed or to change the guide channel diameter in order to obtain the best performance.

INFORMATION:

upon specific request, non standard collets with reduced thickness (which are not mentioned in this table) may be supplied as well. Their durability is however below the durability of standard collets.

10.2 REVOLVING TIP - TABLE

The choice of the revolving tip depends on the diameter of the guide channel, and bar pusher and on the version of the collet coupling.

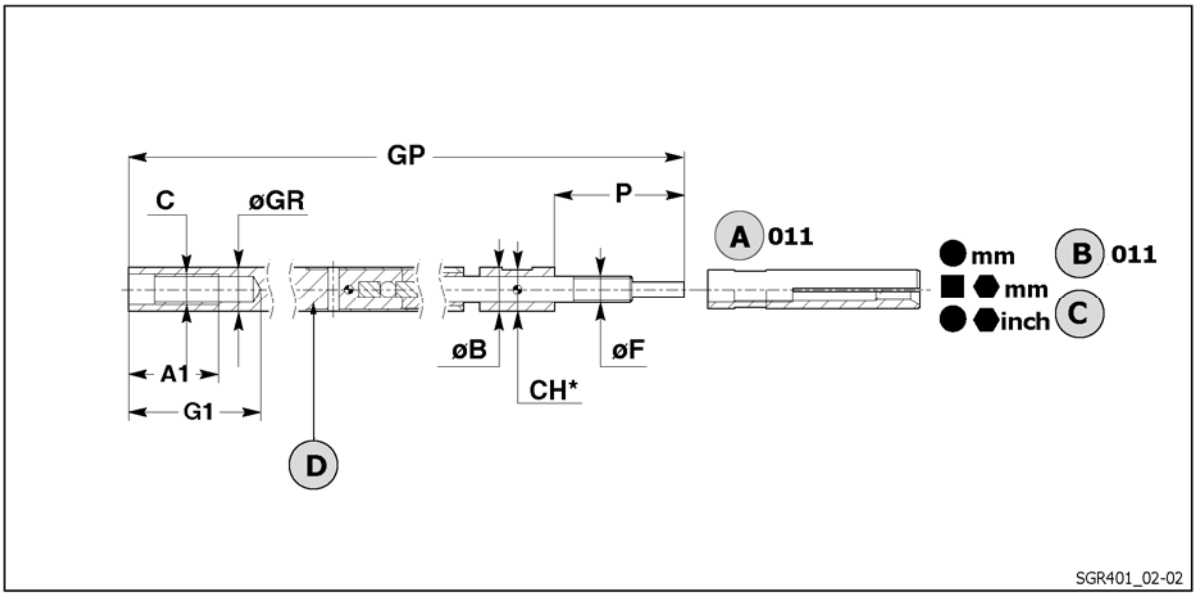


A Guide channels
B Bar pusher
C Revolving tip
D Collet
E Bar

Guide channel diameter **øB** (mm)	Bar pusher diameter **øC** (mm)	Collet version – **D** (type of coupling)	Revolving tip diameter **øGR** (mm)	Revolving tip code
8	7.5	Threaded (IEMCA)	7.5	D73150705
11	10/7	With quick coupling pin	8.5	D73150805
	10	With quick coupling pin	10	D71151011
13	12/10	With quick coupling pin	10	D71151011
	12		12	D711511211
17	16/15	With quick coupling pin	15	D71151511
	16		16	D71151611
21	20/18	With quick coupling pin	18,5	D71151811
	20		19,5	D71151911
			20,5	D71152011
24	23/20	With quick coupling pin	21,5	D71152111
	23		22,5	D71152211
			23,5	D71152311

10.3 Revolving Tips øGR 7.5÷8.5 - Table

- **For collets with threaded coupling (IEMCA)**



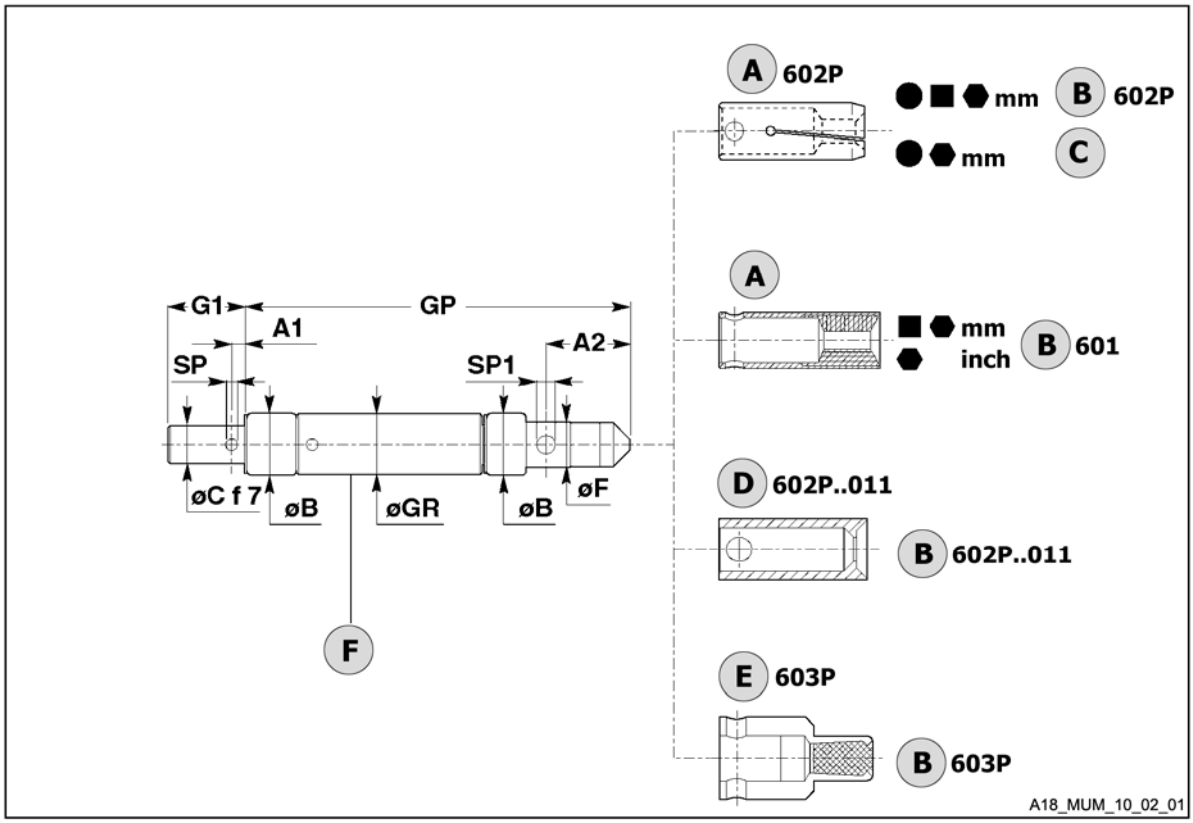
A Collet
B See file
C See file 001
than 011
D Revolving tip

CH*: double-ended fork wrench DIN3110

øGR (mm)	Revolving tip code	**øF** (mm)	**øB** (mm)	**GP** (mm)	**G1** (mm)	**C** (mm)	**A1** (mm)	**P** (mm)	**CH** (mm)
7.5	D73150705	M5x0.5	7.5	151	25	M6x0.75	17	24.5	7
8.5	D73150805	M5x0.5	8.5	151	25	M6x0.75	17	24.5	7

10.4 Revolving tips øGR 12÷27 - Table

- **For collets with quick coupling pin**



A Collet
B See the paragraph "Collets for 011 bars" Chap.11
C See the paragraph "Conversion tables 001" and then "Collets for 602P bars" Chap.11
D Ejector
E Pipe collet
F Revolving tip

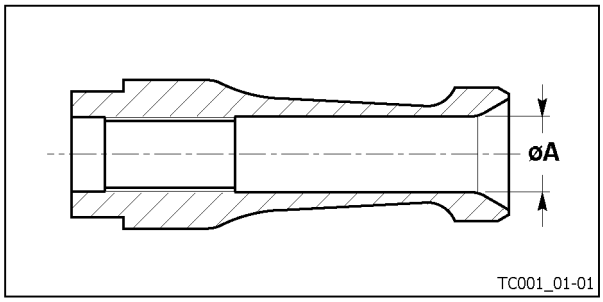
øGR (mm)	Revolving tip code	**øF** (mm)	**øB** (mm)	**GP** (mm)	**G1** (mm)	**C** (mm)	**A1** (mm)	**øSP** (mm)	**A2** (mm)	**øSP1** (mm)
10	D71151011	7	10.5	143	30	8	6	3	18	4
12	D71151211	8	12.5	143	30	8	6	3	18	4
15	D71151511	11	15.5	160	35	12	6	3	18.5	6
16	D71151611	11	16.5	160	35	12	6	3	18.5	6
18	D71151811	11	18.5	160	35	12	6	4	18.5	6
19	D71151911	11	19.5	160	35	12	6	4	18.5	6
20	D71152011	14	20.5	172.5	35	14	6	4	37.5	8
21	D71152111	14	21.5	172.5	35	14	6	4	37.5	8
23	D71152311	14	23.5	172.5	35	14	6	4	37.5	8

INDEX

11 CONVERSION TABLES 001

11.1 HEXAGONAL BARS (unit of measurement "millimetres") - Table

Before selecting the steel collet, define the internal diameter øA by referring to the table below.



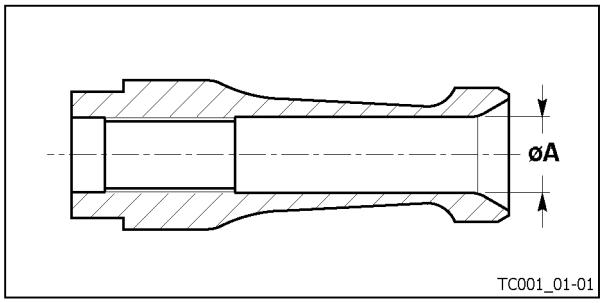
Z	Y=Zx1,154	ØA	Z	Y=Zx1,154	ØA
mm	mm	mm	mm	mm	mm
1.5	1.73	1.7	28	32.33	32
2	2.31	2.2	29	33.48	33.2
2.5	2.89	2.8	30	34.64	34.5
3	3.48	3.25	31	35.79	35.5
3.5	4.04	3.8	32	36.95	36.8
4	4.61	4.5	33	38.10	37.8
4.5	5.19	5	34	39.25	39
5	5.77	5.5	35	40.41	40.2
5.5	6.35	6.2	36	41.56	41.3
6	6.92	6.8	38	43.87	43.5
6.5	7.50	7.3	39	45.03	44.8
7	8.08	7.8	40	46.18	46
7.5	8.66	8.5	41	47.34	47
8	9.23	9	42	48.49	48.2
9	10.39	10.2	43	49.65	49.5
10	11.54	11.3	44	50.80	50.5
11	12.70	12.5	45	51.96	51.8
12	13.85	13.5	46	53.11	52.8
13	15.02	14.8	48	55.42	55
14	16.16	16	50	57.73	57.5
15	17.32	17.2	52	60.04	59.5
16	18.47	18.3	55	63.50	63
17	19.62	19.5	57	65.78	65.25
18	20.78	20.6	60	69.24	68.75
19	21.93	21.8	62	71.55	71
20	23.09	22.8	65	75	74.5
21	24.24	24	67	77.3	76.75
22	25.40	25.2	70	80.78	80.25
Z	Y	ØA	Z	Y	ØA

	Y=Zx1,154	
mm	mm	mm
23	26.55	26.2
24	27.71	27.5
25	28.86	28.5
26	30.02	29.8
27	31.17	31

	Y=Zx1,154	
mm	mm	mm
72	83.08	82.5
75	86.55	86
80	92.32	91.75
85	98.1	97.5

11.2 SQUARE BARS (unit of measurement "millimetres") - Table

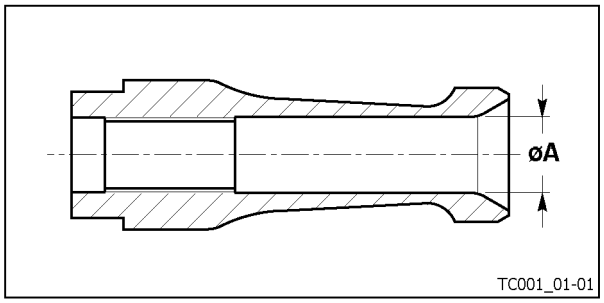
Before selecting the steel collet, define the internal diameter øA by referring to the table below.



Z	Y	ØA	Z	Y	ØA
	Y=Zx1,414			Y=Zx1,414	
mm	mm	mm	mm	mm	mm
1	1.41	1.3	20	28.28	27.5
1.5	2.12	2	22	31.10	30.5
2	2.82	2.7	23	32.52	32
2.5	3.53	3.4	24	33.93	33
3	4.24	4	25	35.35	34.5
4	5.65	5.5	26	36.76	36
4.5	6.36	6.2	27	38.17	37.5
5	7.07	6.8	28	39.59	38.5
5.5	7.77	7.5	30	42.42	41.5
6	8.48	8.3	32	45.24	44.5
6.5	9.19	9	34	48.07	47
7	9.89	9.7	35	49.49	48.5
8	11.31	11	36	50.90	50
8.5	12.01	11.8	37	52.31	51.5
9	12.72	12.5	38	53.73	52.5
10	14.14	13.8	39	55.15	54.5
10.5	14.84	14.5	40	56.56	55.5
11	15.55	15	41	57.97	57
12	16.97	16.5	42	59.38	58.5
12.5	17.67	17	43	60.08	59
13	18.38	18	44	62.21	61
14	19.79	19.5	45	63.63	62.5
15	21.21	20.8	46	65.04	64
16	22.62	22	50	70.7	69.5
17	24.04	23.5	55	77.77	76.75
18	25.52	25	60	84.84	83.75
19	26.86	26	65	91.91	91

11.3 HEXAGONAL BARS (unit of measurement "inches") - Table

Before selecting the steel collet, define the internal diameter øA by referring to the table below.

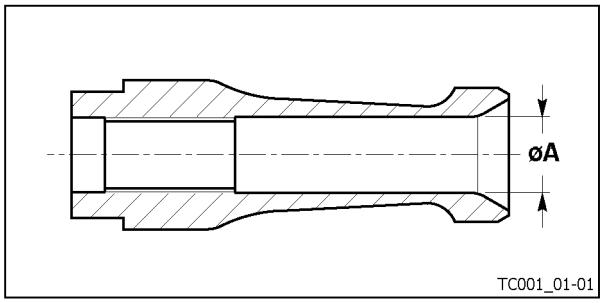


Z	ØA	
inches	mm	inches
1/8	3.5	9/64
3/16	5.25	13/64
1/4	7	9/32
5/16	8.75	11/32
3/8	10.75	27/64
7/16	12.5	31/64
1/2	14.25	9/16
9/16	16.25	41/64
5/8	18	45/64
11/16	19.75	25/32
3/4	21.75	55/64
13/16	23.5	59/64
7/8	25.25	63/64
15/16	27.25	1”5/64
1”	29	1”9/64
1”1/16	30.75	1”13/64
1”1/8	32.5	1”9/32
1”3/16	34.25	1”11/32
1”1/4	36.25	1”27/64
1”5/16	38	1”1/2

Z	ØA	
inches	mm	inches
1”3/8	39.75	1”9/16
1”7/16	41.75	1”41/64
1”1/2	43.5	1”23/32
1”9/16	46.5	1”53/64
1”5/8	47.25	1”55/64
1”11/16	49	1”15/16
1”3/4	50.75	2”
1”13/16	52.75	2”5/64
1”7/8	54.5	2”9/64
1”15/16	56.25	2”7/32
2”	58	2”9/32
2”1/16	59.75	2”11/32
2”1/8	61.5	2”27/64
2”3/16	63.5	2”1/2
2”1/4	65.25	2”37/64
2”1/2	72.5	2”55/64
2”3/4	79.75	3”9/64
3”	87	3”27/64
3”1/4	94.25	3”23/32

11.4 ROUND BARS - (unit of measurement "inches") - Table

Before selecting the steel collet, define the internal diameter øA by referring to the table below.



inches	ØA mm	inches	ØA mm	inches	ØA mm
1/32	0.8	17/32	13.5	1”1/8	28.5
3/64	1.2	35/64	14	1”3/16	30.25
1/16	1.6	9/16	14.25	1”1/4	31.75
5/64	2	37/64	14.75	1”5/16	33.25
3/32	2.4	19/32	15	1”3/8	35
7/64	2.8	39/64	15.5	1”7/16	36.25
1/8	3.2	5/8	16	1”1/2	38
9/64	3.6	41/64	16.25	1”9/16	39.75
5/32	4	21/32	16.75	1”5/8	41.25
11/64	4.4	43/64	17	1”11/16	43
3/16	4.8	11/16	17.5	1”3/4	44.5
13/64	5.2	45/64	18	1”13/16	46
7/32	5.6	23/32	18.25	1”7/8	47.75
15/64	6	47/64	18.75	1”15/16	49.25
1/4	6.4	3/4	19	2”	50.75
17/64	6.8	49/64	19.5	2”1/16	52.5
9/32	7.2	25/32	19.75	2”1/8	54
19/64	7.6	51/64	20.25	2”3/16	55.5
5/16	8	13/16	20.75	2”1/4	57.25
21/64	8.4	53/64	21	2”5/16	58.75
11/32	8.8	27/32	21.5	2”3/8	60.5
23/64	9.1	55/64	21.75	2”7/16	62
3/8	9.6	7/8	22.25	2”1/2	63.5
25/64	10	57/64	22.75	2”9/16	65
13/32	10.4	29/32	23	2”5/8	66.75
27/64	10.8	59/64	23.5	2”11/16	68.25
7/16	11.25	15/16	24	2”3/4	70
29/64	11.5	61/64	24.25	2”13/16	71.5
15/32	12	31/32	24.75	2”7/8	73
31/64	12.5	63/64	25	2”15/16	74.75
1/2	12.75	1	25.5	3”	76.25
33/64	13.25	1”1/16	27		

11.5 CONVERSION TABLE Inches/Millimetres

Inch fraction		Inch fraction			
		1	2	3	4
		Millimetres			
0	**0**	0	25,400 0	50,800 0	76,200 0
1/64	**0,015 625**	0,396 9	25,796 9	51,196 9	76,596 9
1/32	**0,031 25**	0,793 8	26,193 8	51,593 8	76,993 8
3/64	**0,046 875**	1,190 6	26,590 6	51,990 6	77,390 6
1/16	**0,062 5**	1,587 5	26,987 5	52,387 5	77,787 5
5/64	**0,078 125**	1,984 4	27,384 4	52,784 4	78,184 4
3/32	**0,093 75**	2,381 2	27,781 2	53,181 2	78,581 2
7/64	**0,109 375**	2,778 1	28,178 1	53,578 1	78,978 1
1/8	**0,125**	3,175 0	28,575 0	53,985 0	79,375 0
9/64	**0,140 625**	3,571 9	28,971 9	54,371 9	79,771,9
5/32	**0,156 25**	3,968 8	29,368 8	54,768 8	80,168 8
11/64	**0,171 875**	4,365 6	29,765 6	55,165 6	80,565 6
3/16	**0,187 5**	4,762 5	30,162 5	55,562 5	80,962 5
13/64	**0,203 125**	5,159 4	30,559 4	55,959 4	81,359 4
7/32	**0,218 75**	5,556 2	30,956 2	56,356 2	81,756 2
15/64	**0,234 375**	5,953 1	31,353 1	56,753 1	82,153 1
1/4	**0,25**	6,350 0	31,750 0	57,150 0	82,550 0
17/64	**0,265 625**	6,746 9	32,146 9	57,546 9	82,946 9
9/32	**0,281 25**	7,143 8	32,543 8	57,943 8	83,343 8
19/64	**0,296 875**	7,540 6	32,940 6	58,340 6	83,740 6
5/16	**0,312 5**	7,937 5	33,337 5	58,737 5	84,137 5
21/64	**0,328 125**	8,334 4	33,734 4	59,134 4	84,534 4
11/32	**0,343 75**	8,731 2	34,131 2	59,531 2	84,931 2
23/64	**0,359 375**	9,128 1	34,528 1	59,928 1	85,328 1
3/8	**0,375**	9,525 0	34,925 0	60,325 0	85,725 0
25/64	**0,390 625**	9,921 9	35,321 9	60,721 9	86,121 9
13/32	**0,406 25**	10,318 8	35,718 8	61,118 8	86,518 8
27/64	**0,421 875**	10,715 6	36,115 6	61,515 6	86,915 6
7/16	**0,437 5**	11,112 5	36,512 5	61,912 5	87,312 5
29/64	**0,453 125**	11,509 4	36,909 4	62,309 4	87,709 4
15/32	**0,468 75**	11,906 2	37,306 2	62,706 2	88,106 2
31/64	**0,484 375**	12,303 1	37,703 1	63,103 1	88,503 1
1/2	**0,5**	12,700 0	38,100 0	63,500 0	88,900 0
33/64	**0,515 625**	13,096 9	38,496 9	63,896 9	89,296 9
17/32	**0,531 25**	13,493 8	38,893 8	64,293 8	89,693 8
35/64	**0,546 875**	13,890 6	39,290 6	64,690 6	90,090 6
9/16	**0,562 5**	14,287 5	39,687 5	65,087 5	90,487 5
37/64	**0,578 125**	14,684 4	40,084 4	65,484 4	90,884 4
19/32	**0,593 75**	15,081 2	40,481 2	65,881 2	91,281 2
39/64	**0,609 375**	15,478 1	40,878 1	66,278 1	91,678 1
5/8	**0,625**	15,875 0	41,275 0	66,675 0	92,075 0
41/64	**0,640 625**	16,271 9	41,671 9	67,071 9	92,471 9
21/32	**0,656 25**	16,668 8	42,068 8	67,468 8	92,868 8
43/64	**0,671 875**	17,065 6	42,465 6	67,865 6	93,265 6

Inch fraction		Inch fraction			
		1	2	3	4
		Millimetres			
11/16	**0,687 5**	17,462 5	42,862 5	68,262 5	93,662 5
45/64	**0,703 125**	17,859 4	43,259 4	68,659 4	94,059 4
23/32	**0,718 75**	18,256 2	43,656 2	69,056 2	94,456 2
47/64	**0,734 375**	18,653 1	44,053 1	69,453 1	94,853 1
3/4	**0,75**	19,050 0	44,450 0	69,850 0	95,250 0
49/64	**0,765 625**	19,446 9	44,846 9	70,246 9	95,646 9
25/32	**0,781 25**	19,843 8	45,243 8	70,643 8	96,043 8
51/64	**0,796 875**	20,240 6	45,640 6	71,040 6	96,440 6
13/16	**0,812 5**	20,637 5	46,037 5	71,437 5	96,837 5
53/64	**0,828 125**	21,034 4	46,434 4	71,834 4	97,234 4
27/32	**0,843 75**	21,431 2	46,831 2	72,231 2	97,631 2
55/64	**0,859 375**	21,828 1	47,228 1	72,628 1	98,028 1
7/8	**0,875**	22,225 0	47,625 0	73,025 0	98,425 0
57/64	**0,890 625**	22,621 9	48,021 9	73,421 9	98,821 9
29/32	**0,906 25**	23,018 8	48,418 8	73,818 8	99,218 8
59/64	**0,921 875**	23,415 6	48,815 6	74,215 6	99,615 6
15/16	**0,937 5**	23,812 5	49,212 5	74,612 5	100,012 5
61/64	**0,953 125**	24,209 4	49,609 4	75,009 4	100,409 4
31/32	**0,968 75**	24,606 2	50,006 2	75,406 2	100,806 2
63/64	**0,984 375**	25,003 1	50,403 1	75,803 1	101,203 1

11.6 COLLET FOR 011 BARS

11.7 COLLET FOR BARS - Table

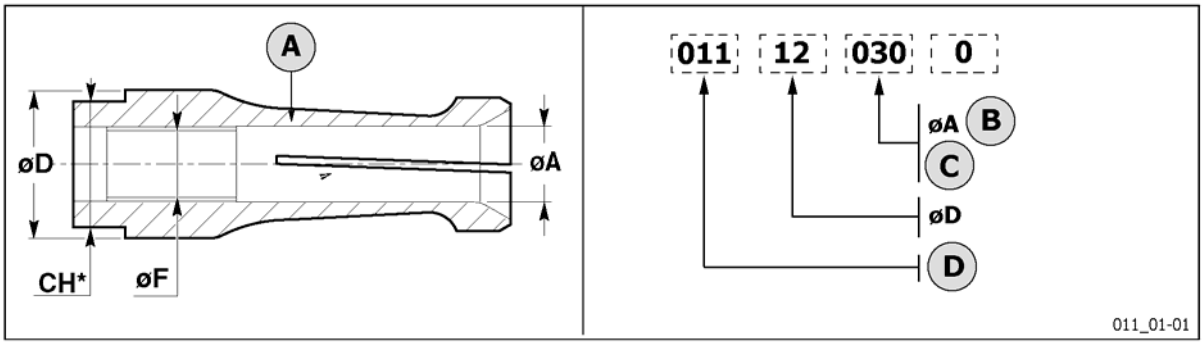
WARNING – CAUTION:

the collet external diameter should be at least 0.5 mm smaller than the bar pusher external diameter.

INFORMATION:

upon specific request, non standard collets with reduced thickness (which are not mentioned in this table) may be supplied as well. Their durability is however below the durability of standard collets.

Code structure



CH*: double-ended fork wrench DIN3110

A Collet
B Bar diameter
C Example:
0.8 mm = 008
3 mm = 030
12.25 mm = 122
12.5 mm = 125
D Category

External diameter (mm) **øD**	Diameter (mm) **øF**	CH	Internal diameter (mm) **øA**	
			MIN	MAX
7,5	M5x0,5	6	0,8	6,7
10	M6x0,75	8	1	9
12	M7x0,75	10	1	11
15	M8x1	13	2	14
16	M8x1	13	3	15
17	M8x1	13	14	16
18	M8x1	16	12,5	16,75
19	M8x1	16	16	18
20	M10x1	17	3	19
23	M10x1	19	13	22

11.8 COLLETS FOR BARS 602P

11.9 COLLET FOR BARS - Table

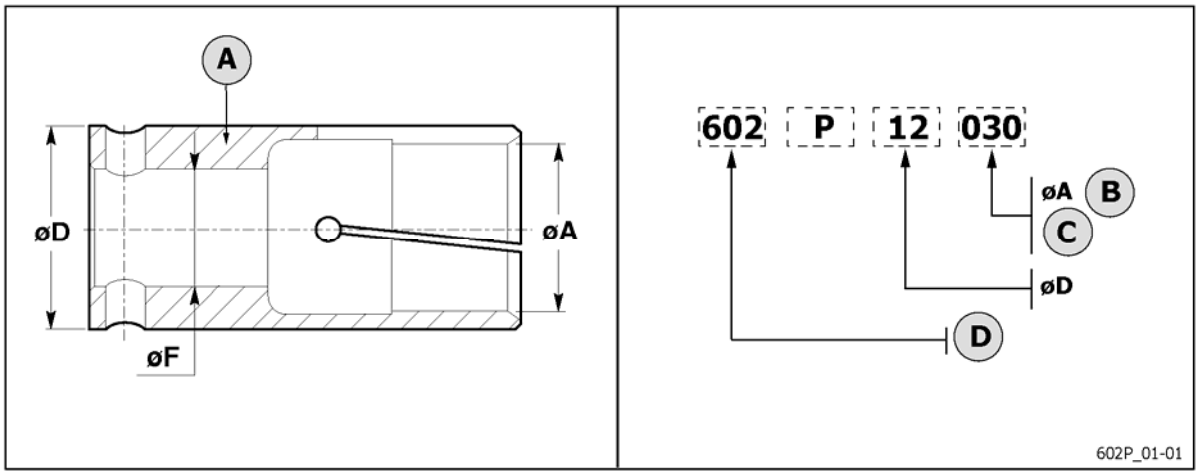
WARNING – CAUTION:

the collet external diameter should be at least 0.5 mm smaller than the bar pusher external diameter.

INFORMATION:

upon specific request, non standard collets with reduced thickness (which are not mentioned in this table) may be supplied as well. Their durability is however below the durability of standard collets.

Code structure



A Collet
B Bar diameter
C Example:
3 mm = 030
3.5 mm = 035
12.5 mm = 125
12.75 mm = 127
D Category

External diameter (mm) **øD**	Diameter (mm) **øF**	Internal diameter (mm) **øA**	
		MIN	MAX
10	Ø7 G6	3	8
12	Ø8 G6	3	10
15	Ø11 G6	4	13
16	Ø11 G6	11	14
18	Ø11 G6	8	16
20	Ø14 G6	6	18
21	Ø14 G6	16,5	19
23	Ø14 G6	14	21

11.10 BORING COLLETS FOR BARS 601P

11.11 BORING COLLETS FOR SQUARE AND HEXAGONAL BARS - Table

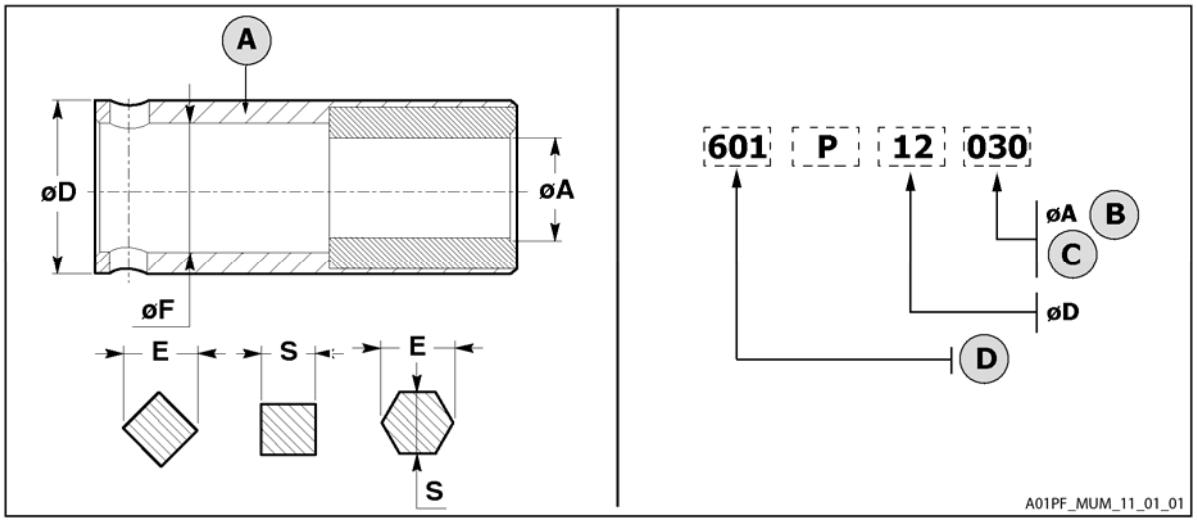
INFORMATION:

to determine the internal diameter øA do not refer to "001 - Conversion Tables", but refer directly to the table below.

INFORMATION:

upon specific request, non standard collets with reduced thickness (which are not mentioned in this table) may be supplied as well. Their durability is however below the durability of standard collets.

Code structure



A Collet
B Bar diameter
C Example:
3 mm = 030
3.5 mm = 035
12.5 mm = 125
12.75 mm = 127
D Category

S square bars (S=E/1,414)		**S hexagonal bars** (S=E/1,154)		External diameter (mm) **øD**	Diameter (mm) **øF**
MIN	MAX	MIN	MAX		
3	3	3	4	7,5	M5x0,5
4	6	5	7	12	Ø8 G6
6	10	6	13	18	Ø11 G6
7	12	* 5/16”	15	21	Ø14 G6

WARNING: the values indicated with * are expressed in inches.

11.12 EJECTORS 602P..011

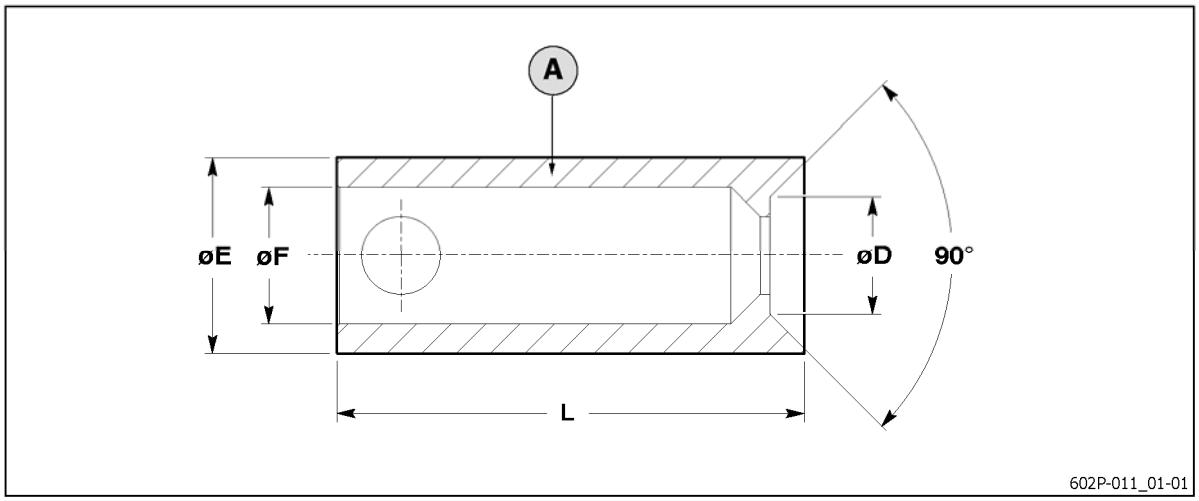
11.13 EJECTORS – Guide channels ø13÷23 - Table

WARNING – CAUTION:

the external diameter of the ejector must be at least 0.5 mm less than the external diameter of the bar pusher.

INFORMATION:

upon specific request, non standard collets with reduced thickness (which are not mentioned in this table) may be supplied as well. Their durability is however below the durability of standard collets.



A Ejector

øE (mm)	**øF** (mm)	**øD** (mm)	**L** (mm)	Code no.
12	8	8	24	602P12011
15	11	11	26	602P15011
16	11	12	26	602P16011
18	11	12	27.5	602P18011
19	11	12	28	602P19011
20	14	12	47.5	602P20011
23	14	12	49	602P23011

11.14 PIPE COLLETS 603P

11.15 PIPE COLLETS - Table

WARNING – CAUTION:

the collet external diameter should be at least 0.5 mm smaller than the bar pusher external diameter.

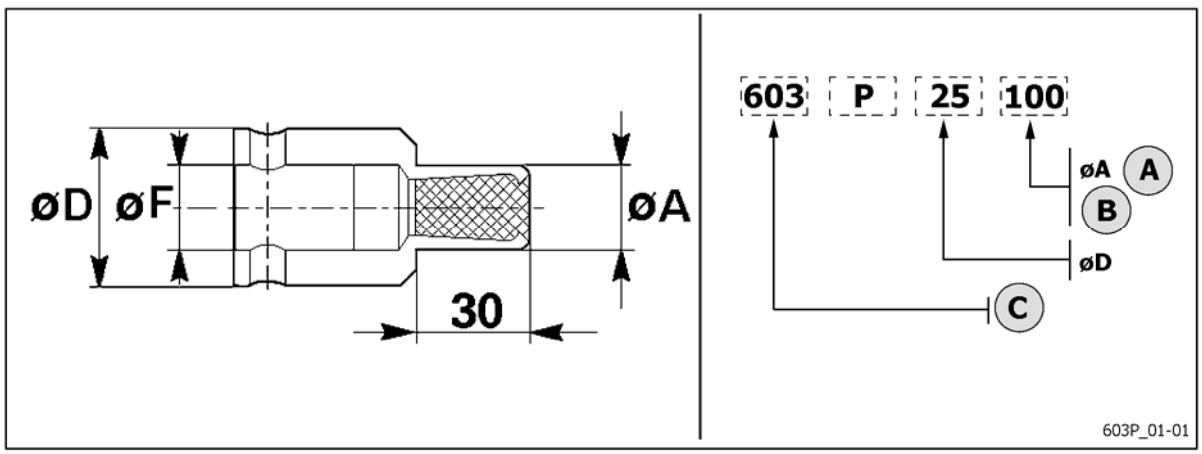
INFORMATION:

For the 603P collets..... fitted with a quick coupling, allowing the assembly on the revolving tips, are designed with an oversized length. Therefore, the first feeding value of the bar pusher carriage shall be increased of 7.5 mm with respect to the standard value.

INFORMATION:

upon specific request, non standard collets with reduced thickness (which are not mentioned in this table) may be supplied as well. Their durability is however below the durability of standard collets.

Code structure



A Bar diameter
B Example:
5 mm = 060
10 mm = 100
12.5 mm = 125
C Category

External diameter (mm) **øD**	Diameter (mm) **øF**	External diameter (mm) **øA**	
		MIN	MAX
12	Ø8 G6	5	9,5
15	Ø11 G6	5	11
15-16	Ø11 G6	11,5	14
20	Ø14 G6	6	18