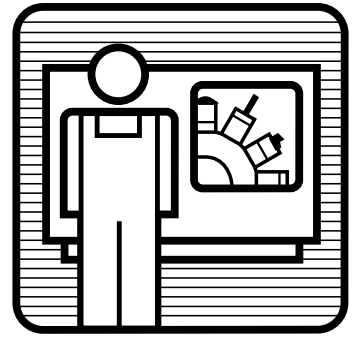# BETRIEBS-ANLEITUNG

Operating Instructions · Manuel d'opération

Bar Loading Magazine

INDEX LM 3200
LM 3700
LM 4200

INDEX ABC

Control INDEX C 200-4

INDEX

Note on applicability

Some illustrations in this publication may deviate slightly from the product supplied, but this will not detract from their instructional value.

The right of alteration by reason of technical progress is reserved by **INDEX**.

A word on copyright

Contents

			Spindle capacity		
			25	36	52
Stock bar diameter					
round		mm	8-25,4	8-36	8-52
square	1,2)	mm	6-14	6-20	6-20
hexagon	1)	mm	7-22	7-30	7-41
octagon	1)	mm	7-22	7-32	7-40
(suitable for draw bars)					
Bar length					
LM 3200	max.	mm	3200		
over bar diameter 25	min.	mm	2500		
up to bar diameter 25	min.	mm	1500		
LM 3700	max.	mm	3700		
over bar diameter 25	min.	mm	2500		
up to bar diameter 25	min.	mm	1500		
LM 4200	max.	mm	4200		
over bar diameter 25	min.	mm	2500		
up to bar diameter 25	min.	mm	1500		
Bar support		mm	approx. 300 = 6 bars DIA. 52		
New bar insert time		sec	approx. 5		
Oil (ISO VG 68)	LM 3200	l	approx. 150 liter		
	LM 3700	l	approx. 175 liter		
	LM 4200	l	approx. 200 liter		
Output circulating pump		kW	0,75		
Weight (without oil)	LM 3200	kg	700		
	LM 3700	kg	795		
	LM 4200	kg	875		

1) **Hex or squared off stock requires separate order of alignment equipment.**
2) **only in relation with guidesleeve 904908.----- see ´required accessories´ pos.1.**

Right of alteration reserved!

The loading magazine is transported on a wooden pallet.
When lifting it off the pallet with a fork lift, two square wooden beams (nailed together with wood strips) have to be placed between both base supports under the tub (Fig. 1).
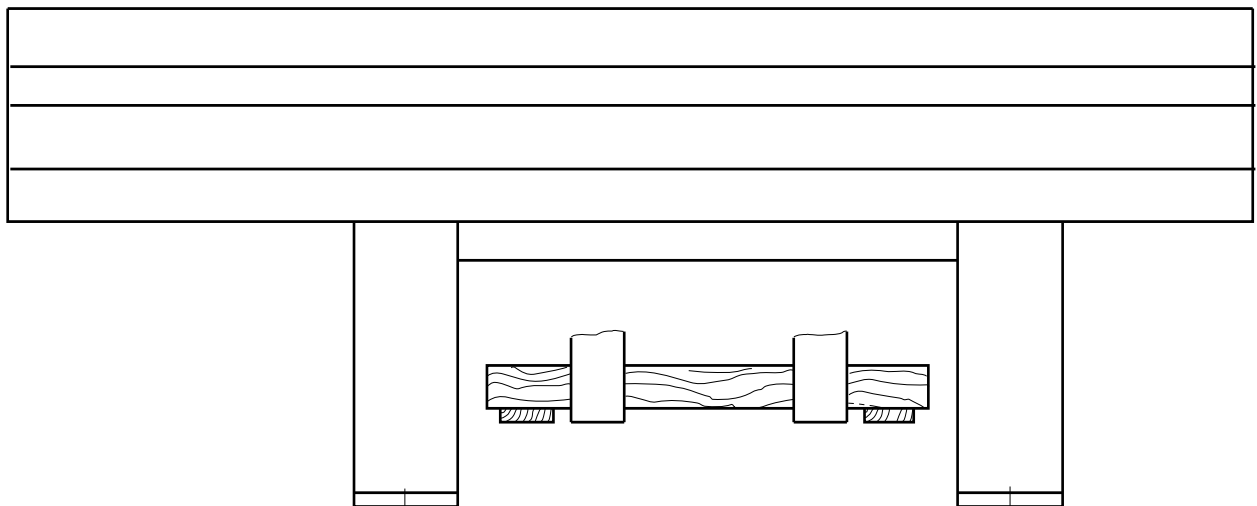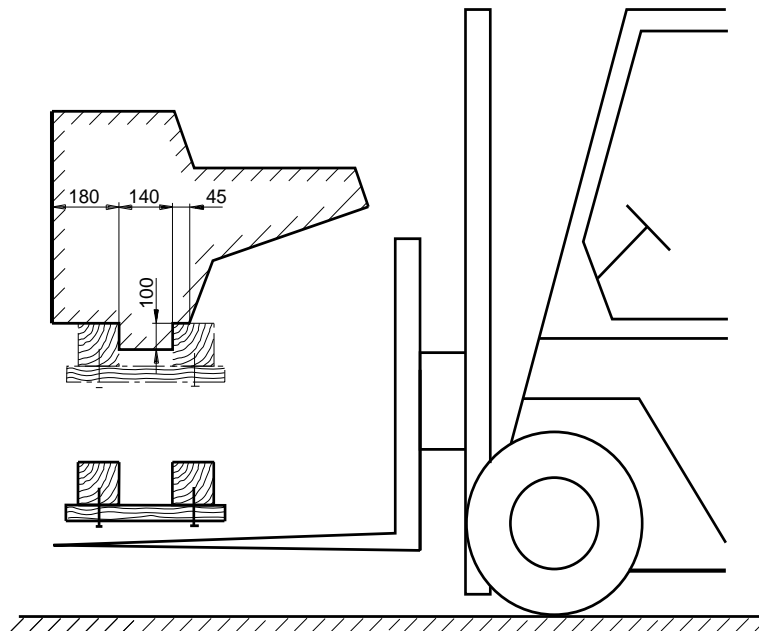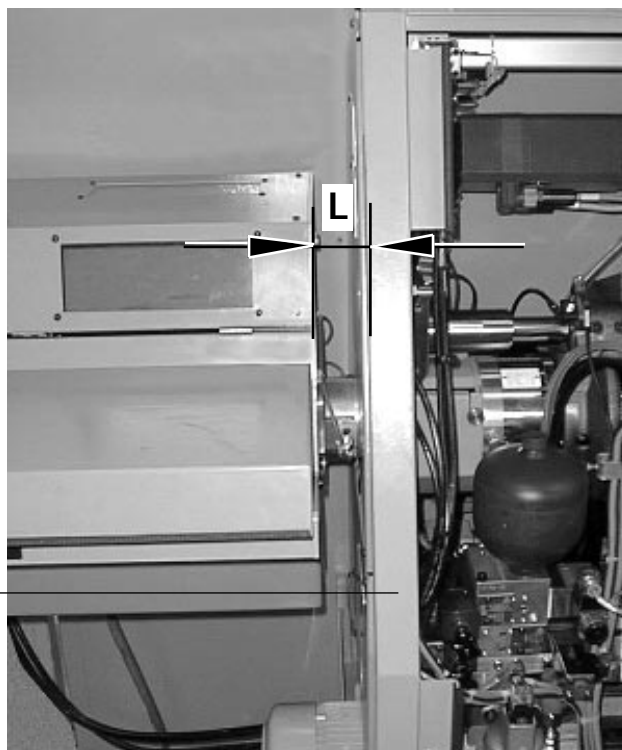The longitudinal center of balance is approx. the middle between the base supports.

Fig. 1

L1601.10081/1

Installation

Remove left machine cover
The distance 'L' (figure 2) is measured between left machine frame bar and right load magazine front side.

LM3200	starting with	332	up to unit no.	331
LM3700	unit no.	92		91
LM4200	(see name plate)	55		54
	L=45		**L=20**	

Frame bar

Fig. 2

L1601.10089_8

The two hydraulic hoses of the loading magazine must be connected to the couplings (P and T) at the left face of the machine.

The electrical power supply must be connected to the marked plug located at the electrical cabinet of the machine.

⚠️ *Before plugging in or unplugging the electric supply the main isolating switch must be absolutely OFF.*

The transport securing device at guide channel has to be removed.
Last the central lubrication oil has to be added. (Oil level indicators on left face of machine.)

Securing to the floor

The bar loading magazine and the machine must be anchored securely to the floor
(see machine installation plan resp. figure 2 - dimension **L**).

After alignment the bar loading magazine can be secured to the floor with bolts by drilling through the separate base plates.
The length of the fastening bolts depends on the floor condition. These bolts have to be adjusted by the installer.

Alignment - bar loading magazine

The alignment must be done with extreme care keeping in mind that the spindle speeds, noise level and the quality of the workpiece depend on the alignment.
An "alignment aid" suitable for all INDEX ABC machines and all loading magazine lengths is available - Sel. No. 39 189.

A very tightly pulled nylon line, 2 mm DIA., is used for the alignment. This nylon line is fastened exactly in the center at the left end of the guide channel and the workspindle collet adapter (Fig. 3). Close guide channel, advance so channel is locked, then drive approx. 400 mm to the left again.
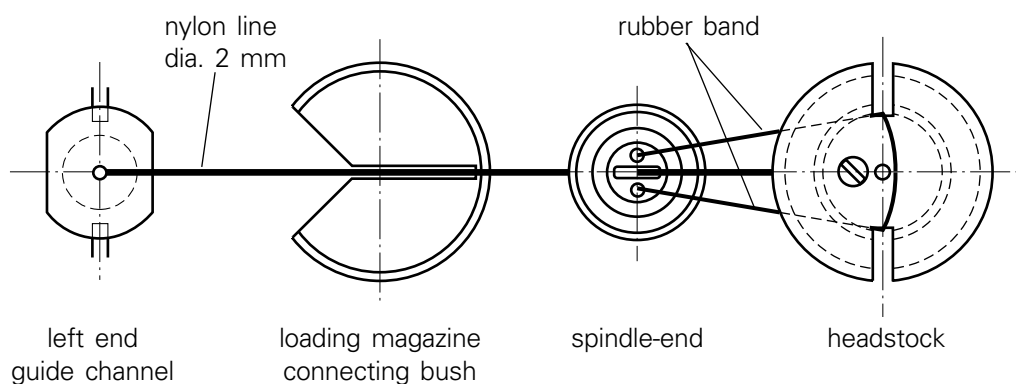

nylon line dia. 2 mm   rubber band

Fig. 3

| left end guide channel | loading magazine connecting bush | spindle-end | headstock |

L1601.10081/3

Slotted diaphragms are attached at the spindle-end and the connecting bush of the bar loading magazine and - if loading magazine is correctly aligned - it will guide the nylon line directly through the center slots.
By turning the slotted diaphragms 90 degrees the horizontal and vertical alignment can be checked.

The following steps are recommended:

1. Pass nylon line through slotted diaphragm at spindle-end and pull it tight.

2. Turn both slotted diaphragms until the line passes freely through the slots.
   At this point alignment error can be roughly evaluated and corrected.

3. Remove slotted diaphragm from loading magazine and proceed with fine adjustment until the nylon line runs in horizontal and vertical direction straight through the center of the slotted diaphragm at the spindle-end.

4. Re-attach slotted diaphragm on loading magazine and here too correct alignment in both directions.

> *Both loading magazine base supports have to be adjusted to different degrees but in the same direction in order to maintain alignment in accordance with point 3.*

Pictures showing the construction of the bar loading magazine
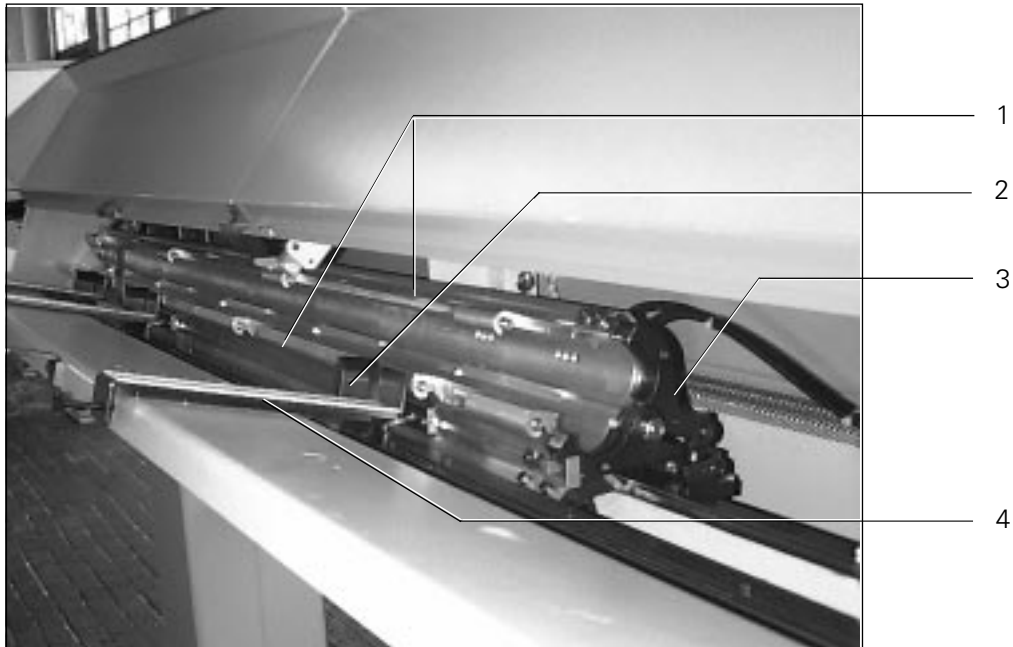
L1601.10081/12

Light barrier within working area

up to LM unit no.   331- LM3200
91 - LM3700
54 - LM4200

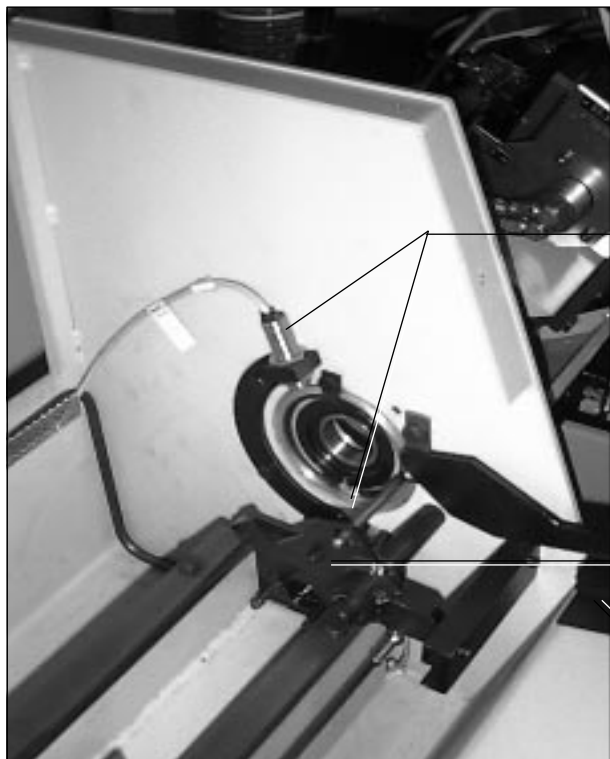L1601.10081/11

1 Guide channel (open)

2 Bar separator

3 Clamping jaws

4 Supply area

5 Light barrier

6 Support dovetail

7 Stopping strip

Light barrier outside the working area

starting with LM unit no. 332 - LM3200
92 - LM3700
55 - LM4200

L1601.10089_2

L1601.10089_1

The bar loading magazine is a standard feature of the INDEX ABC turning machine, the electrics and hydraulics making it one unit.

As long as a stock bar is being machined the bar loading magazine functions only as an oil filled stock tube (split guide channel) because stock feed in the workspindle is done with feed fingers. The oil which generates minimal oil pressure in the guide channel is transported out of the loading magazine tub by a booster pump (the magazine tub also serving as an oil reservoir).

The bar change has been divided into 2 sections:

Section 1:   A new bar is loaded (Fig.4, 5):
         • When the bar end has passed the light barrier.
         • When half the number of the strokes set in the bar feed counter is obtained.

Section 2:   When the part of the bar inside the workspindle is totally used up then the new bar is inserted through the workspindle all the way to the cutoff tool, at which time the bar remnant is ejected into the work area.

Figure 7 , section "Set-up bar loading magazine" - schematic sectional view of the loading magazine.
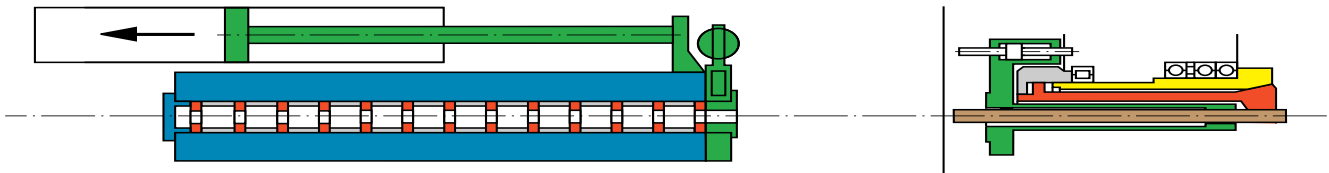
Reset guide channel and load new bar

Fig. 4

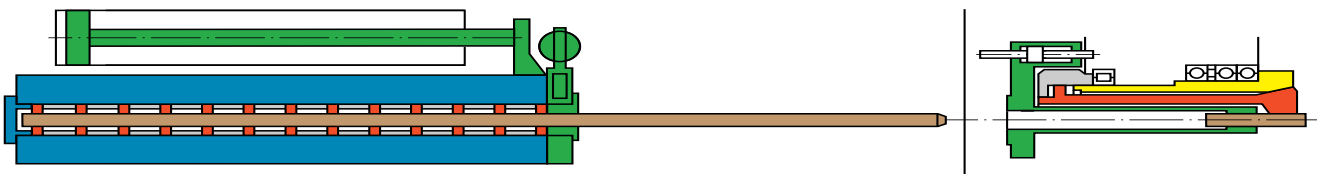**Advance guide channel to working position**

L1601.10081/13

Fig. 5

Bar change - Section 1

A photo electric beam at the right end of the guide channel emits a signal when the bar has left the loading magazine.This signal activates the bar feed counter (refer to section „Setting of the bar feed counter"). The bar change is initiated after half the number of the set strokes has been performed. The machine continues to run due to one bar remaining in the workspindle (bar approx. 0.5 m in length).

The loading magazine leaves its **work/start position** (see Fig.4) for the bar loading cycle and the following steps are to be observed:

1. The circulating lube pump providing the guide channel with oil shuts off.

2. A hydraulic cylinder slides the guide channel approx. 1 m to the left unlocking the two channel parts. Also the next bar will be separated from the supply area by lifting with swivel levers.

3. A hydraulic cylinder opens up the hinged top part of the guide channel. Then the previously separated stock bar is brought up completely and rolls into the split bushings of the lower guide channel, dampened by brake rings. A support dovetail on the right hand side catches the bar-end.
   The stock bars at the right hand of the supply area are stored against a support gib so that the start-of-bar program has a defined location in the guide channel. This arrangement is supported by the swivel levers which upon lifting the bars are pushing these to the right against the gib.

4. If hex or square stock is involved the locating equipment (OPTION) has to turn the stock surface to a specific position. A hydraulic cylinder drives out a flexible locating fork against the bar and swivels it around the stock bar axis.

5. The guide channel is locked. Stock is clamped by two jaws, matched to the stock profile, at the right end of the guide channel. Hex or square stock is clamped in aligned position to the stock surface (see Fig.5).

The 1st section of the bar change has been completed and the loading magazine is in **Waiting position.**
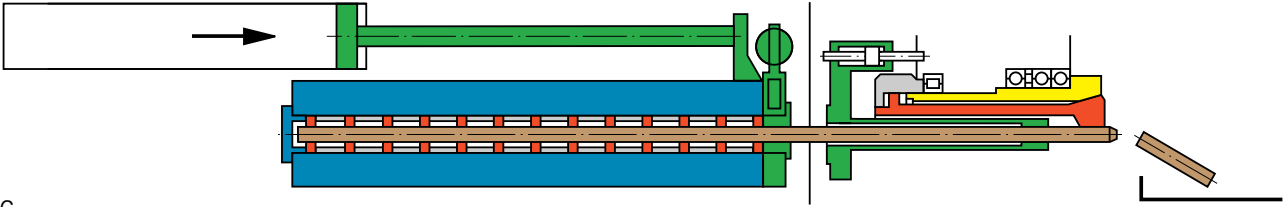
Push forward new bar and eject remainder

Fig. 6

L1601.10081/14

Bar change - Section 2

When the machine signals "bar-end" the start-of bar program starts (feed finger has retracted from stock-end). The following steps are observed (see Fig.6):

6.   Cut-off last workpiece.

7.   Stop spindle with hex or square stock in defined angular position.

8.   Drive remnant tray in front of spindle.

9.   Open collet and advance feed finger.

10. Start central lube pump for loading magazine.

11. On moving guide channel into start position, bar is pushed into the feed finger and advanced to the cut-off tool. The bar remnant is ejected into the remnant tray (see Fig.6).
     The distance between start-of-bar and collet can be changed (depending on the position of the cut-off tool) by adjusting the stopping strip of the bar supply.
     When advancing guide channel, both channel parts lock together, the bar separating levers retract and the bar supply is pushed forward. A brake cylinder allows round bars to drop slowly below.

12. Close collet and open clamping jaws.

13. Retract remnant tray.

Start-of bar program is now ready - it consists of the following steps:

14. Set workspindle speed.

15. Clean up bar face with cut-off tool.

16. Execute stock feed and clamping.

17. Start of next normal work cycle.

When bar supply is used up the guide channel advances empty and the light barrier registering "NO BAR" shuts off the machine.

The loading magazine has no independent operating panel and is controlled by the machine's control panel.
The special screen mask is selected with softkeys as follows:

【M】 **–> Operate units –> more units –> feeder**

Feeder		set bar
		open feeder
Number bars 5		close feeder
		feeder forward
Total parts counter Nomin. 0 Actual 12		feeder back
Quantity counter 3 actual 0		load bar
Quantity counter 4 actual 0		retooling on/off

When at the end of the series the function "Change-over loader" is desired the number of the bars to be machined can be input under **"Number of bars"**.

Description of the softkey functions

**Feeder forward /
back**
Advance/retract guide channel.
Guide channel and clamping jaws are always closed for this function (The chucking cylinder of the workspindle must be open).
When the guide channel has advanced to the front both channel halfs are locked and the clamping jaws open automatically.
When retracting the guide channel the central lubricating pump shuts off and is switched on in advanced position when the light barrier signals "Bar present".

Open / close feeder
Open and close guide channel and clamping jaws.
This is only possible when the guide channel is in retracted position.

Set bar
(OPTION) Only when machining hex or square stock
Advance and retract locating equipment for squared-off stock (this is only possible when the guide channel is open).

Retooling on / off	This function enables changing-over the loading magazine after the bar has left the bar loading magazine.

This function enables changing-over the loading magazine after the bar has left the bar loading magazine.
This means that changing-over can be started already while the part of the bar in the feed tube is being machined, i.e. used up.

Process after "Setting-up on"

- Guide channel retracts.
- The number of bars is counted by 1 downwards and a new bar is loaded.
- When the number of bars is "0", the channel stops opened in rear position
  –> display "**426 Loader change-over**".
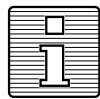
When change-over is desired prematurely, it is possible to overwrite the bar counter manually. The bar loader will stop in spite of bar stock being present.

- When the bar in the feed tube is used up, branching into the bar start program is automatic.
- The machine will stop –> display **"427 Machine change-over"**.

By pressing the RESET key all displays are reset.

Load bar

Loading of a new bar

Procedure

- Deposit the bar onto the storage surface
- Close guide channel and advance
- Press softkey **Bar loading**

Movements can only be executed when the loading magazine cover is closed. If opened, the cover safety switch immediately interrupts all dangerous movements of the loading magazine, for example when bars are inserted automatically at this time.

However the machine continues to operate when cover is open for re-loading of new stock bars.

Observe the PLC-errors in separate error file - error numbers 89103 and 89233.

The right end position of the guide channel is the **work/start position** for bar loading.

The loading magazine leaves this position in four cases:

1. When the stock bar is used up and has left the guide channel, the bar loading cycle starts automatically. The guide channel, free of material, retracts and the new bar is loaded.

2. When replenishing bar supply has been neglected machine remains stopped until bars are reloaded. The guide channel is reloaded on retraction and advances immediately.
   The same condition exists when the loading magazine has been reset and the machine is started (unless a new bar has been loaded with the softkey "Bar loading").

3. On change over of the loading magazine the guide channel, free of material, retracts immediately when the last bar has left the channel.
   The "change over" command must be programmed into the machine within ample time (bar quantity to be loaded or setting-up ON when "Number of bars" = 0).

4. When in manual operation, if for example a partly used bar in the guide channel has to be retracted from the workspindle it is necessary that the workspindle is in idle position with collet open; by hex or square stock in defined angular position.
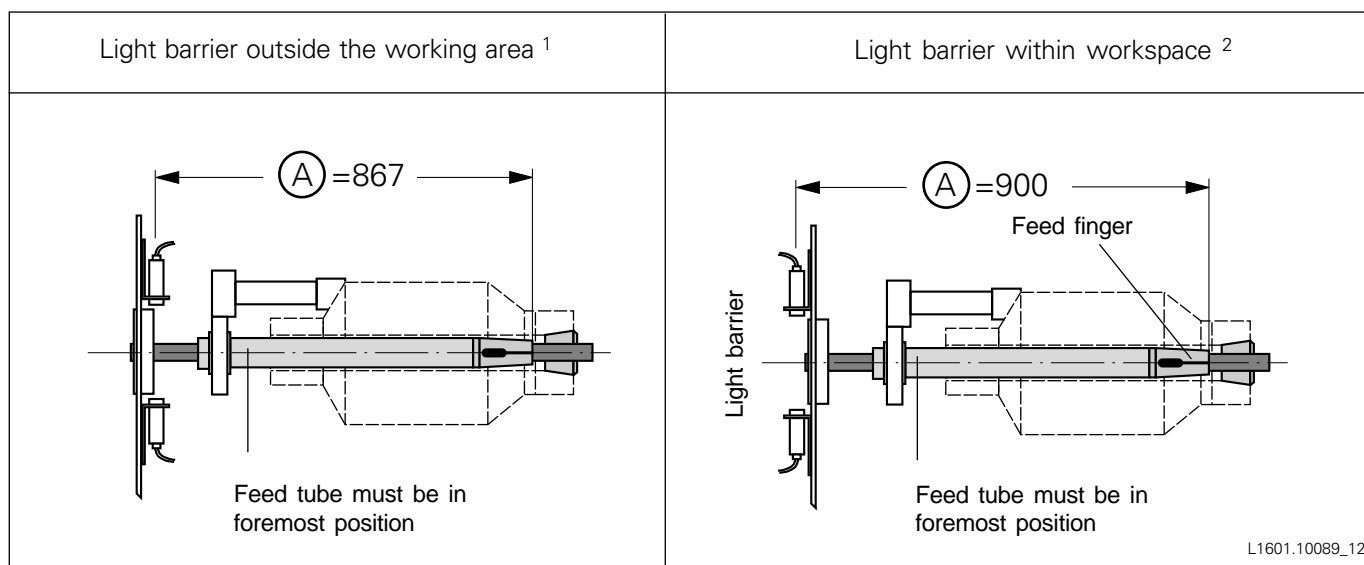
Stock supply should be removed beforehand or a previously separated stock bar must be taken out prior to opening the guide channel.

Setting of the bar feed counter

For reason of operational safety the end-of-material message is evaluated only after the "SPECIFIED number of bar feeds" has been performed.
The end-of-bar message is emitted when the feed finger slips off the bar remnant.

Light barrier outside the working area [1]	Light barrier within workspace [2]
A = 867 Feed tube must be in foremost position	A = 900 Feed finger Light barrier Feed tube must be in foremost position L1601.10089_12

The specified number of bar feeds is established as follows:

$$\frac{\text{Useable bar length} = A \text{ mm}}{\text{Workpiece length} + \text{cut-off width}} - 4$$

Example: The bar must be fed out twice for the production of a workpiece.
–> Established number of feed-outs must be doubled.

The useable bar length represents the distance between the light barrier and the front face of the feed finger (approx. A mm).

When feeding-out the bar several times is required for the production of one workpiece, this must be taken into account when establishing the number of bar feeds.

| [1] starting with LM unit no.		[2] up to LM unit no.
LM3200	332	331
LM3700	92	91
LM4200	55	54

The input of the established value is done by the change over program or manually in the picture „Quantity counter". This is selected as follows:

| M | –> **Process selection –> Quantity counter** |

Cursor

```
                    Quantity counter

Total parts counter          Nomin.      0      Actual        0
Workpiece pulling attachment Nomin.     30      Actual        0
Quantity counter 3  Actual        0   Quantity counter 3  Actual      0

                    autres compteurs
```

Y31134/9-02

↑
← →
↓
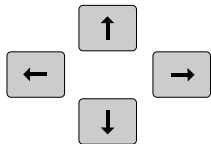
Position the cursor to **Workpiece pulling attachment   NOMIN**.

⇨ Write the established value in the entry line and press **INPUT.**

Programming examples

Change over program

```
%MPF52xx
(LOADING PROCESS FEEDING DATA)
N0005 R50=4 L150
N0010 R1=1 R4=0 R10=xx* L151          (1st Feeding length and branching into bar start program.)
(LADEVORGANG MAFU)                    R10=Specified number of parts bar pulling attachment
N0015 R50=9 L150
N0020 R1=1 R2=1 L151                  (Clamping cylinder 1 active)
N0025 R1=3 R2=10001 L151             (Clamping cylinder 3 active)
N0030 R1=9 R2=1 L151                  (Bar feed active)
```

* *When R10 is programmed greater than zero, this will be loaded in the **SPECIFIED number of parts** and the **ACTUAL number of parts** will be reset to zero. When R10 is omitted or R10=0 is programmed, the quantity counter setting must be input manually.*

Machining program

```
%MPF10xx
…
…
N0025 T1 D1                           (Stock stop)
N0030 G0 X0 Z0.5
/N0035 M1=69 M87                      (Open bar clamping, advance feed finger)
N0040 G4 X0.3
N0045 M1=68                           (Close bar clamping)
…
…
N0070 M1487                           (Retract feed finger)
…
```

Bar change

Branching into the bar start program will be automatic after the message „End of bar". In this the cycle L185 will be called. With this cycle a new bar will be loaded into the workspindle. When feeding profile stock the spindle can be positioned via the parameter R12 at an appropriate angle.

Round stock –> R16=1 L185
       └ without spindle positioning

Profile stock –> R12=xx R16=2 L185
             └ with spindle positioning
           └ angle in degrees

The cycle L185 comprises the following process:

- Workspindle STOP at R16=1 or
  positioning the workspindle at R16=2
- Advance remnant tray
- Open bar clamping
- Advance feed finger
- Eject remnant to the front
- Close bar clamping
- Retract remnant tray

Start-of-bar program

Tool carrier 1

```
%MPF17xx
N0005 L100
N0010 G0 G53 X280 Z320 D0
N0015 M4=26 M4=33
N0020 G92 S4=4000
N0025 G59 X=R901 Z=R902
N0030 T2 D2  *1
N0035 R16=1 L185  *2
N0040 G0 X0 Z5 S4=1500 M4=3
N0045 Z-48 M1=8
N0050 G1 G95 Z-63.5 F0.22
N0055 G0 Z-40
N0060 R10=3 L110

N1010 [WAIT M, 10,1,2]




N1020 [WAIT M, 20,1,2]

N9999 M30
```

Tool carrier 2

```
%MPF27xx
N0005 L100
N0010 G0 G53 X320 Z165 D0
N0015 G92 S4=4000
N0020 G59 X=R901 Z=R902
N0025 T6 D36  *3
N0030 G0 Z-54




N2010 [WAIT M, 10,1,2]

N0035 M4=26 M4=33
N0040 G0 X34 M4=3 S4=2500
N0045 G1 G95 X16 F0.07
N0050 G0 X65
N0055 G53 X320 Z165 D0 M1=9
N0060 M1487  *4


N2020 [WAIT M, 20,1,2]

N9999 M30
```

*1 Spot drill Ø 18.5

*2 Bar change with remnant ejection

*3 Cut-off

*4 Retract feed finger

Feeding - feeding - machining

Tool carrier 1

```
%MPF1001
N5 L100
N10 G0 G53 X280 Z280 D0
N15 G59 X=R901 Z=R902
N20 M4=33 M4=26
N25 T1 D1                                          (stop)
N30 G0 X0 Z-50                          (1st stop length)
N35 M1=69
N40 M87                          (feed 1st material bar)
N45 M1=68
N55 M1487                       (feeder collet backwards)
                              (infeed 2nd stop length)

N60 G0 Z0.5 M1587      (wait until feeder collet in rear position)

N1010 [WAIT M 10,1,2]
N65 M10=198 H20717809       (inquiry material end YES/NO)
                              (result will be stored in R50)
N70 @714
N75 R1000=R50                   (load value R50 into R1000)
N1020 [WAIT M 20,1,2]
N80 @122 R1000 K1 K9999
     (with material end skip to M30 - otherwise continue program)

N85 M1=69
N90 M1=87                       (feed 2nd material bar)


N95 M1=68
N100 M1487                      (feeder collet backwards)
N1025 [WAIT M 25,1,2]
(*)
(*)
(machining process)
(*)
(*)
N105 G0 G53 X280 Z280 D0
N1040 [WAIT M 40,1,2]
N110 M392
N115 @100 K-15
N9999 M30
```

Tool carrier 2

```
%MPF2001
N5 L100
N10 G0 G53 X320 Z110 D0
N15 G59 X=R901 Z=R902
(zero point offset)









N2010 [WAIT M 10,1,2]




N2020 [WAIT M 20,1,2]
N25 @714
N30 @122 R1000 K1 K9999






N2025 [WAIT M 25,1,2]
(*)
(*)
(machining process)
(*)
(*)
N35 G0 G53 X330 Z184 D0
N2040 [WAIT M 40,1,2]
N35 M392
N40 @100 K-10
N9999 M30
```

Feeding - machining - feeding - machining

tool carrier 1

```
%MPF1001
N5 L100
N10 G0 G53 X280 Z280 D0
N15 G59 X=R901 Z=R902          (1st zero point offset)
N20 M4=33 M4=26
N25 T1 D1                                      (stop)
N30 G0 X0 Z0
N35 M1=69
N40 M87                          (feed 1st material bar)
N45 M1=68
N50 G0 Z50 M4=3 S4=2800
N55 M1487                       (feeder collet backwards)
N1010 [WAIT M 10,1,2]
(*)
(*)
(1st machining process)
(*)
(*)
N1015 [WAIT M 15,1,2]
N60 G59 X=R901 Z=R904          (2nd zero point offset)
N65 T1 D1
N70 G0 X0 Z0
N1020 [WAIT M 20,1,2]
N75 M10=198 H20717809     (inquiry material end YES/NO)
                          (result will be stored in R50)
                          (load value R50 into R1000)
N80 @714
N85 R1000=R50
N1030 [WAIT M 30,1,2]
N90 @122 R1000 K1 K9999

 (with material end skip to M30 - otherwise continue program)
N95 M4=5
N100 M1=69
N105 M87                         (feed 2nd material bar)
N110 M1=68
N1035 [WAIT M 35,1,2]
(*)
(*)
(2nd machining process)
(*)
(*)
N115 M1487                      (feeder collet backwards)
N120 M4=5
N125 G0 G53 X280 Z280 D0
N1040 [WAIT M 40,1,2]
N130 M392
N135 @100 K-15
N9999 M30
```

tool carrier 2

```
%MPF2001
N5 L100
N10 G0 G53 X320 Z110 D0
N15 G59 X=R901 Z=R902
(1st zero point offset)




N1010 [WAIT M 10,1,2]
(*)
(1st machining process)
(*)
(*)
N2015 [WAIT M 15,1,2]
N20 G59 X=R901 Z=R904
(2nd zero point offset)

N2020 [WAIT M 20,1,2]



N2030 [WAIT M 30,1,2]
N25 @714
N30 @122 R1000 K1 K9999




N1035 [WAIT M 35,1,2]
(*)
(*)
(2nd machining process)
(*)



N2040 [WAIT M 40,1,2]
N35 M392
N40 @100 K-10
N9999 M30
```

The change over of the bar loading magazine can start as soon as the last stock bar has left the magazine and machining of the remaining bar length inside the workspindle is completed.
For set-up/change over the guide channel is positioned on the left hand side and is open.

Set-up of hex or oct. stock
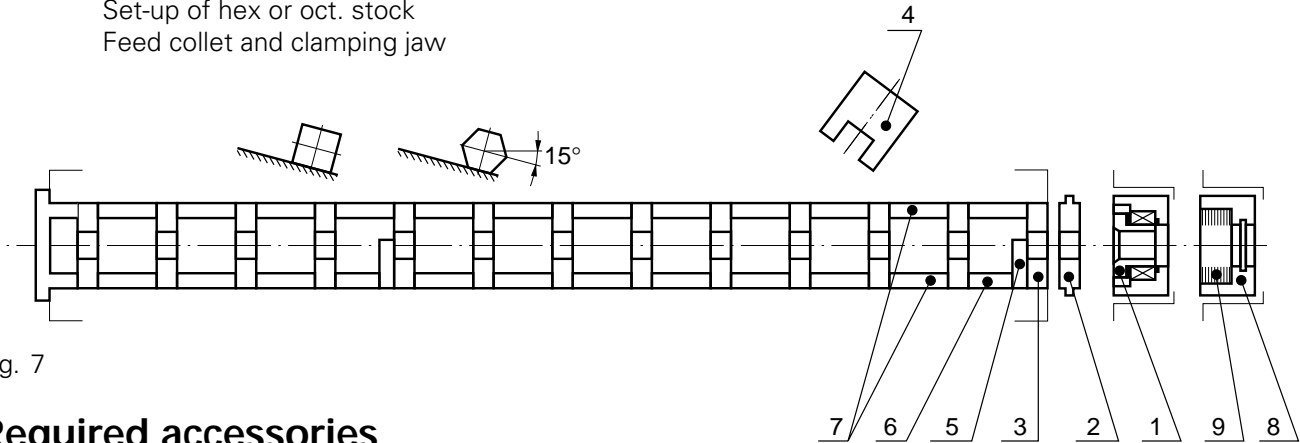Feed collet and clamping jaw

Fig. 7

Required accessories

L1601.10081/4

| Pos.	Description	Part-No.	Number of pieces		
			LM 3200	LM 3700	LM 4200
1	Guide sleeve pre-machined	8 904 908.0001			
	Guide sleeve stock dependent to DIA. 30	904 908.- - - -	1	1	1
2	Clamping jaws pre-worked 2 pcs = 1 set	8 L6 8051			
	Clamping jaws stock dependent round	L6 8051.- - - -	1 set	1 set	1 set
	Clamping jaws stock dependent hex	L6 8061.- - - -	1 set	1 set	1 set
	Clamping jaws stock dependent square	L6 8071.- - - -	1 set	1 set	1 set
	Clamping jaws stock dependent octagon.	L6 8091.- - - -	1 set	1 set	1 set
3	Half-shell stock dependent DIA. 6 - 18*	L6 8001.- - - -	26	32	38
	Half-shell stock dependent DIA. 18 - 30*	L6 8011.- - - -	26	32	38
	Half-shell stock dependent DIA. 30 - 42*	L6 8021.- - - -	26	32	38
	Half-shell stock dependent DIA. 42 - 54*	L6 8031.- - - -	26	32	38
4	Locating fork for hex and square stock				
	pre-machined	8 L6 8041			
	stock dependent	L6 8041.- - - -	1	1	1
5	Brake ring DIA-range 8 - 14	L6 8001.60	2	3	3
	Brake ring DIA-range 14 - 25	L6 8001.70	2	3	3
	Brake ring DIA-range 25 - 40	L6 8001.80	2	3	3
	(starting at DIA. 40 no brake ring)				
6	Spacer short (in connection with brake ring)	L6 8001.50	2	3	3
7	Spacer	L6 8001.40	24	30	36
8	Bush starting with Ø 30	L6 7083.20	1	1	1
9	Round brush Ø42	490 910.0021	1	1	1
9	Round brush Ø52	490 910.0011	1	1	1

* The range diameters are in relation to the bore which has to be larger than the bar diameter.
  Print and measuring-item 1 through 4 - see brochure "Bar dependent accessories for the
  bar loading magazine LM…, literature N° LL1699.1010x".
  Parts-item 5 through 7 are standard equipment; separate order is not necessary.

Bar loading magazine - INDEX ABC

The following steps are recommended for mounting the various components (Fig. 7):

1. Alternate split bushings (half-shells) and spacer into both guide channels. Mount two brake rings in the lower part of the guide channel by LM 3200 (three brake rings by LM 3700 and LM 4200) separated by a short spacer. The left brake ring at the end of the shortest stock bar, the right brake ring just before the last split bushing is inserted. (The brake rings only required to DIA. 40.)

2. The two clamping jaws to be screwed into the clamping collet. (Clamping jaws are stopping the split bushings from sliding out.)

3. Locating fork and gib (by hex and square stock) have to be pushed into the locating attachment from the top aided by a tension spring.

4. Adjust distance between swivel levers and baffles of the supply areas according to the stock diameter, the width across flats respectively, using the data provided in Fig. 8.


$$D \quad A = 0{,}82 \times D$$
$$SW \quad A = 0{,}82 \times SW$$
$$SW \quad A = SW - 1$$

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Fig. 8
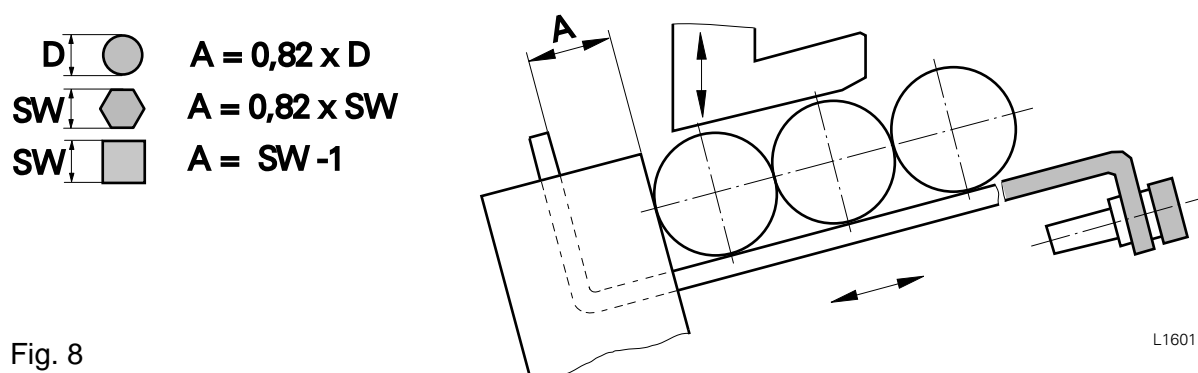
5. Adjust bar face stopping strip to suit the position of the cut-off tool. (Fig.9)

L1601.10089_6
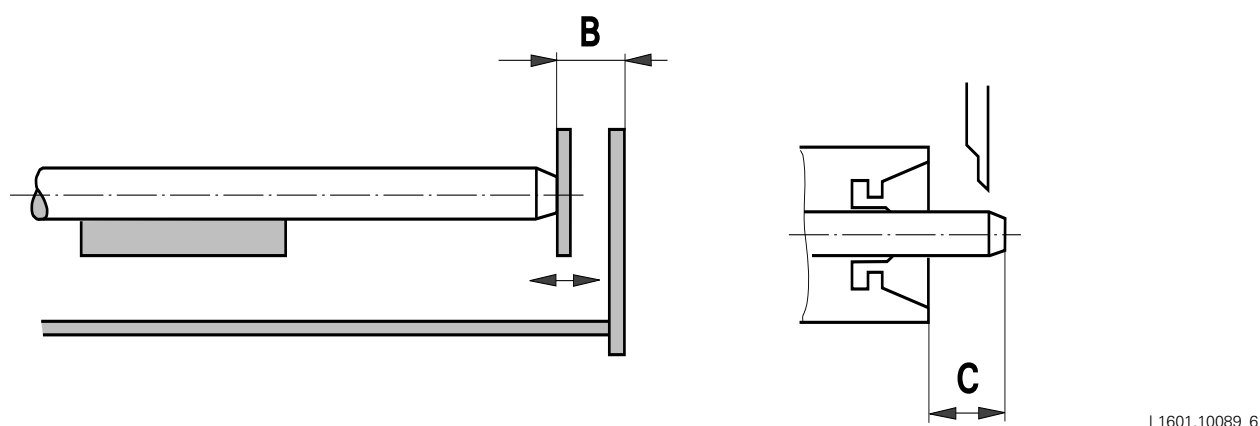
| LM3200	starting with unit no. 332	up to unit no. 331	
LM3700	92		91
LM4200	(see name plate) 55		54
	B=45–C C min.= 15	B=70–C C min.= 15	
	C max.= 25	C max.= 50	

6. Push brake unit down and block, by bars with a diameter smaller than 20 mm or by hex or square stock.

7. Set-up stock bars on supply area surface supported against the gib at the right.

8. Adjust holding down device according to Fig. 8.
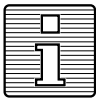
The workspindle will be stopped immediately and an error message is displayed (Danger!!) when the photo electric beam is interrupted at running workspindle.

When machine work cycle is completed the bar loading set-up continues.

9. Insert collet.

10. Adjust **feed slide stroke*** at the feed slide scale (feed slide has to be at right end position) - (Fig. 10).
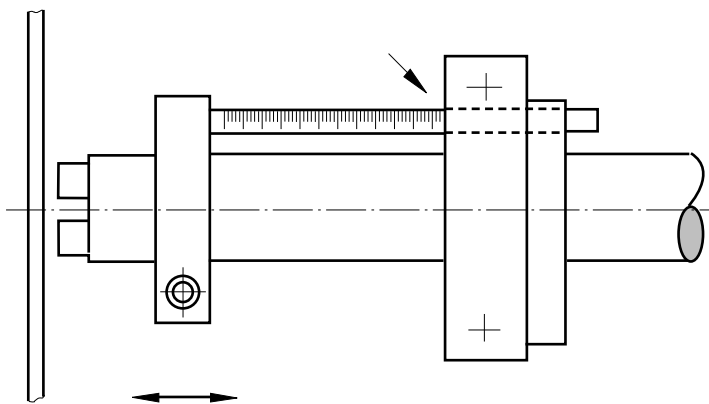
* The **feed slide stroke** consists of:

Workpiece length .... e.g. 20,0 mm
Cut-off width .... e.g. 4,0 mm
Allowance .... 2,0 mm

Stroke to be set .... 26,0 mm

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Fig. 10

11. Insert feed tube with screwed in feed finger, with intermediate guide pipe and stock guide ring from the loading magazine into the spindle and clamp the ball bearings into the supply slide (supply slide must be in left end position).

   Attention: For effortless stock bar feed the **feed fingers** must have a **ground** and **polished** diagonal line at a max. 30 degree angle.
   By **hex or square stock** the feed finger profile has to align with the collet.

   (The availability of an additional feed tube could shorten the set-up time.)

12. Slide ball bearing assembly with guide sleeve into connecting bushing and secure with locking lug. (Guide sleeve only required up to DIA. 30.)
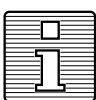
The guide sleeve is needed only up to bar diameter 30.
Starting with Ø30 a round brush is being installed instead of the guide sleeve to wipe off oil from the material bar.

13. Adjust vee rest (Fig. 11) and push unto both slide bars. Connect drive bar to the first swivelling lever.
Vee rest height is adjusted so that the front end of the bar does not sag and glides easily through the guide bush.
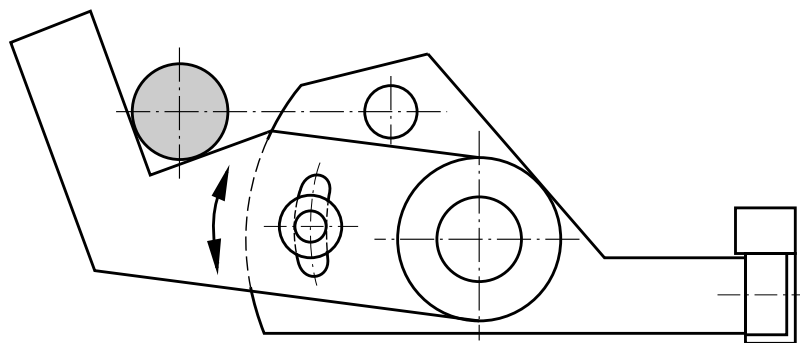(The vee rest is required only up to DIA. 25 mm.)

Fig. 11

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Last the loading magazine is manually advanced to the ready position (guide channel **without material** in ready position at the right), then "Bar loading" in manual mode. Automatic operation can start now.

The alternating locking bars in both guide channels must not collide upon closing of guide channel, therefore, should not be shifted out of position, i.e. must be moved into their correct position again.
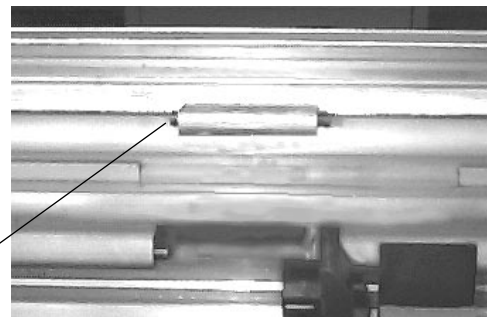
Locking bar

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The stock dependent parts required for set-up are described in the work instructions. All references relating to the optimum measurements are valid only if the following stock bar requirements have been met:

Stock bar requirements

Only cold drawn bars can be machined. Directly dependent on the straightness of the stock bar are achievable speeds, vibrations, noise level as well as the surface condition and tolerance of the workpiece. To achieve the highest values it is permitted only to machine bars which deviate not more than 0.5 mm/m from the straight line. Bar-ends must also be free of buckling or short kinks.
Bars which do not meet these requirements have to be adjusted respectively.
The front bar end has to be chamfered at less than 30 degrees, the same goes for hex and square stock. Bar-end must be free of burrs and bars must be clean!

When machining tubing the ends must be closed tightly using some type of plug or any similar device.

## Adjustment of the oil filling in the guide channel

LM 3200 from serial No. 224
LM 3700 from serial No. 56
LM 4200 from serial No. 31

The oil cushioning of the bar is regulated in relation to the guide channel inserts Ø with the oil flow regulating valve. Four positions can be set (90 degr. grid).

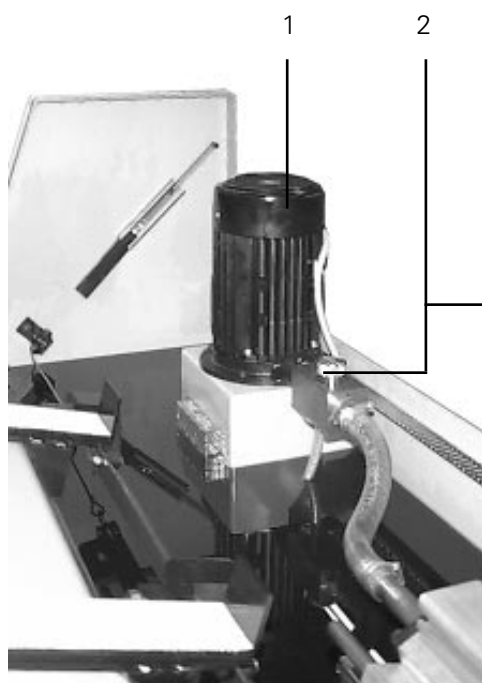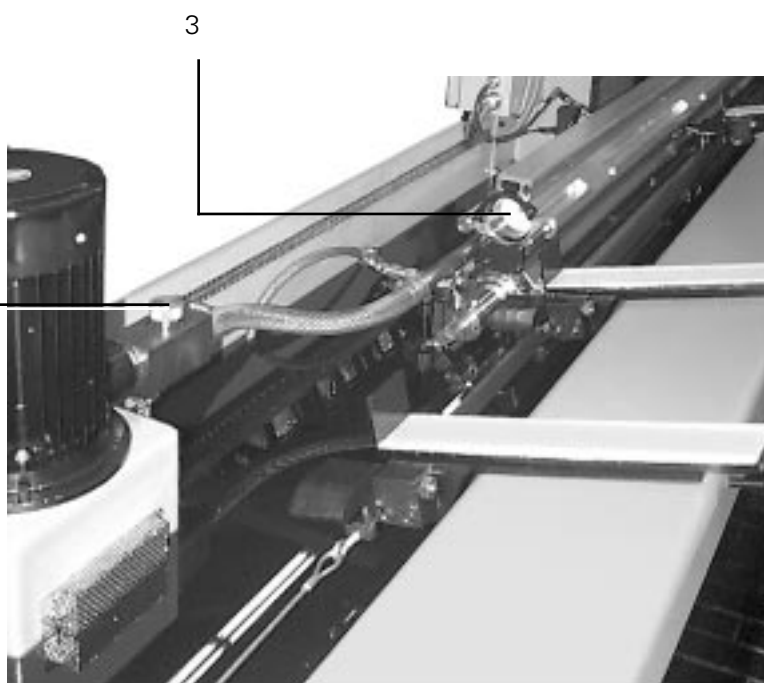*Excessive oil flow from the front of the empty guide channel must be avoided.*

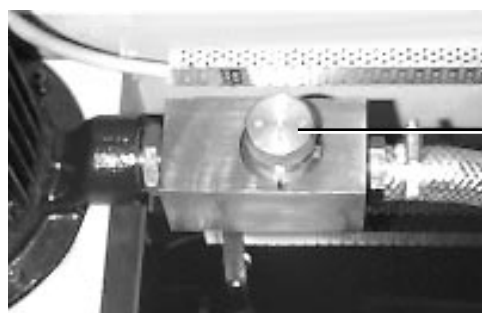| Position oil flow regulating valve	guide channel inserts
1	ca. Ø 6 to 18
2	ca. Ø 18 to 30
3	ca. Ø 30 to 42
4	ca. Ø 42 to 54
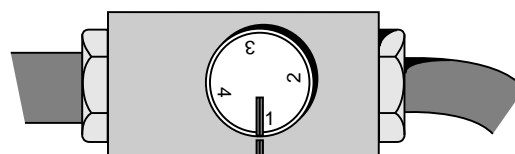
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1 Hydraulic pump

2 Oil flow regulating valve

3 Guide channel with inserts

Required maintenance works

- **Cleaning the intake filter of the circulating lube pump**
  The filter (2) below the circulating lube pump can be removed for cleaning.

- **Topping up the oil**
  Observe the oil level display (1) on the left side. The level must always be between the minimum and the maximum marks.

- **Oil change**
  The oil must be sucked out for the oil change. (A draining screw has been omitted for safety reasons.) The accumulated dirt at the bottom can then be removed.

- **Cleaning the light barrier**

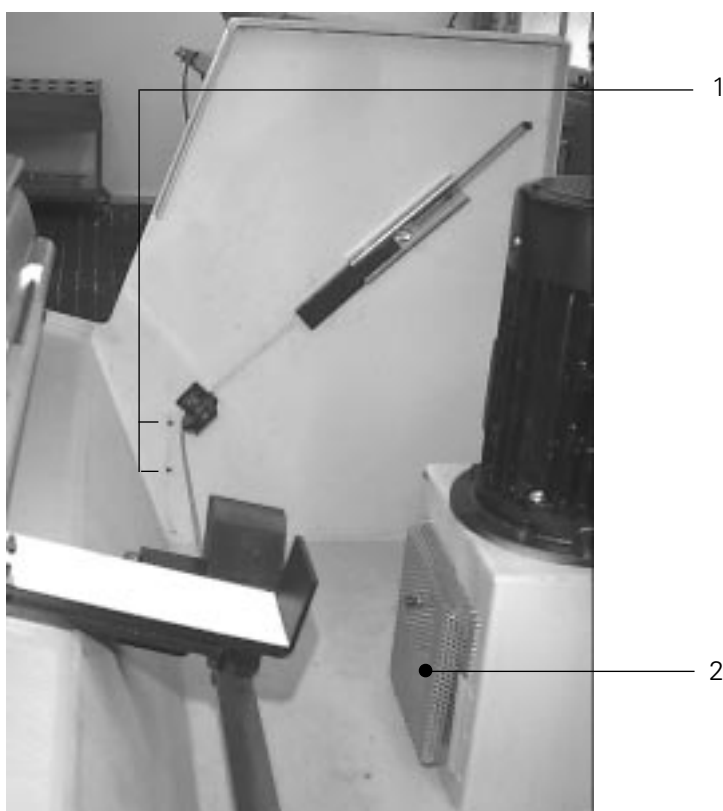The hydraulic and electric manuals are included in the machine documentation.

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Fig.: Oil level display and filter

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