Original operating instructions

FMB turbo 3-26 series 7
FMB turbo 3-36 series 5
ab RM-Nr. 855348
NOTICE!

The technical documentation of the FMB loading magazine comprises:

- FMB – operating instructions
- FMB – spare parts list
- FMB – electrical circuit diagram
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0. Safety instructions for operating the loading magazine

0.1 Explanation of symbols and signs

You will find this symbol alongside all working safety instructions in these operating instructions wherever there is danger to life or the risk of personal injury. Pay attention to these instructions and take great care in such cases.

This symbol can be found in these operating instructions wherever special care is necessary to ensure that guidelines, regulations, notes and the correct sequences of operation are observed, and in order to prevent damage to and destruction of the unit.

0.1.1 Safety symbols at the loading magazine

Warning of a hazard area

Warning of hazardous voltage

Warning of hand injury
0.2 Operation

- Safety devices such as doors, guards and covers must neither be dismantled nor rendered inoperable. They must be closed before operating the loading magazine and must not be opened during operation.

- Any changes to the loading magazine which have an adverse effect on safety must be reported immediately to the parties responsible.

- Do not switch off the loading magazine at the main switch while a program is running. This could result in damage.

- Only press the Emergency Stop key if there is a danger to persons or a risk of damage to the unit (also before carrying out maintenance and repair work).

- Ensure that the loading magazine is securely fixed and has adequate stability during transport (see section 2 of these instructions).

- The loading magazine should be set up in such a way that the center line of the pusher and the center line of the lathe spindle are aligned with each other (see section 3 of these instructions).

- Check the electrical interface and the operating voltage before starting up the loading magazine (see section 4 of these instructions).

- Before starting up the loading magazine, fill up with 80 liters of one of the oil grades recommended in section 1.3 of these instructions.

- Do not throw waste material into the oil.

- Speed limitations (vibrations, noise) resulting from work piece dimensions and out-of-true material bars should also be taken into consideration.
ATTENTION!

When working on the open guide channel the safety bolt always must be inserted!
0.3 Maintenance and repairs

• Servicing, maintenance and repairs may only be carried out by specially trained personnel or suitably instructed persons.

• During all work on the loading magazine, particularly when the covers are open, press the Emergency Stop key and close the compressed air valve of the loading magazine. For maintenance or repair work, the main switch of the lathe must be switched off. The unit must be depressurized and disconnected from the electrical supply.

• During repair work on electrical equipment, the relevant regulations must be observed. (DIN EN 60204 (VDE 0113), DIN VDE 0100; DIN EN 50178 (VDE0160); accident prevention regulations as issued by the Employer's Liability Insurance Associations.)

• Special care must be taken if the unit has to be kept ready for operation during certain types of repair work. Ensure that no persons are in the danger zone.

• Any safety devices that have been removed for the purpose of maintenance and repair work should be refitted immediately on completion of the work.

• Use only clean oils as recommended in section 1.3 of these instructions.

0.4 Intended use

The FMB-loading magazine is determined for assembly with machine tools and exclusively serves to supply automatic lathes with round, square or hexagonal bar and tube shaped materials. The commissioning is forbidden until it has been ascertained that the unit is in accordance with the EG directives.

Material diameters should be in accordance with the "Technical Data" section. Other profile materials should be used after loading magazine manufacturer consultation only. Intended use also results from the technical data, from the requirements of oil fillings, material bars and speed limitations (see point 1, Technical Data, with sub-points).

When the requirements as specified by the manufacturer are met, the loading magazine will work below the maximum permissible noise level.

The loading magazine shall only be used in dry rooms having a temperature between +15º C and +40º C and a humidity of 30% to 75% (non-condensing). Altitude must not exceed 1000 meters above sea level.

Intended use also includes the observance of the operating, maintenance and overhaul conditions as specified by manufacturer.

The loading magazine shall not be used by any other persons than those being acquainted therewith and taught in its inherent dangers.

The relevant regulations for the prevention of accidents as well as all other commonly recognized safety rules should be observed.

Any application going beyond should be deemed as not being in accordance with the intended use. Manufacturer shall not be liable for any damages resulting therefrom; the risk shall solely be borne by user. Any unauthorized loading magazine modification shall exempt the manufacturer from any and all liabilities for damages resulting therefrom.
0.5 Patent rights

We reserve the right of ownership to these operating instructions and the attached documents at all times.

These may not be copied, duplicated or passed on, or made available to third parties, without our written permission.

0.6 Safety precautions

Read these operating instructions carefully before commissioning the loading magazine and pay close attention to the contents!

The loading magazine must only be used, maintained and repaired by persons who are familiar with the operating instructions and the current regulations on industrial safety and accident prevention.

Ignoring such instructions and spec sheets may cause physical injury and material damage.

The operator must be aware of the ‘Technical Instructions on Hazardous Matters’ and respective specification sheets of the applied oil and to observe them.

Trouble-free and safe operation of the bar loading magazine depends on proper transport, correct installation and commissioning, as well as careful operation and maintenance. The loading magazine has been constructed according to the latest state of technology, and is reliable and safe to operate. However, the loading magazine can be dangerous if it is used improperly by untrained personnel, or for purposes other than the intended purpose.

The following regulations have been taken into account in the construction of the loading magazine and preparation of the documentation:

DIN EN ISO 12100
DIN EN 60204
DIN EN 62079

If the loading magazine is delivered within the EU, the "CE symbol" has been attached to the loading magazine. The “EC Declaration of Conformity” is enclosed.

Attention: We would like to point out that the operator of the unit must guarantee the EC conformity.
0.7 Safety devices

0.7.1 Covers
In accordance with current regulations, the loading magazine is guarded by covers to prevent access to moving parts. The cover above the lateral storage is monitored by switches -S74, -S75.

**Shifting device: (option)**
The basic position of the loading magazine is monitored by switch -S76.

The power supply to the solenoid valves is disconnected by safety switches -S74,-S75, -S76 and the safety relay -K20. Via the -K21 contactor the voltage supply for the drive motor is switched off.
The open position of the covers is also evaluated in the PLC.
If the covers are open the following error message appears on the control panel display:

```
FAULT: COVER NOT CLOSED -S74/S75/S76/K20/K21
```

Automatic mode is switched off.

**Operation with bundle loader: (option)**
The basic position of the bundle loader is monitored by switch -S77.

The sliding doors of the bundle loader are monitored by two switches. It is possible to open the doors of the bundle loader without risk in automatic mode in order to reload material bar. The power supply to the contactor of the -M3 motor is disconnected by safety switches -S72, -S73.

If the automatik mode is started with opened sliding doors or the keys Belts wound up, Belts wound down are operated, the following error message appears on the control panel display:

```
FAULT: COVER NOT CLOSED -S72/S73/S74/S75/S76/S77/K20/K21
```

Automatic mode is switched off.
For conversion work the sequence of steps specified in the Operating Instructions must be followed!

Press the Emergency Stop key and close the compressed air valve on the loading magazine to depressurize the system before opening the covers.
Option: It is possible to open the doors of the bundle loader in automatic mode in order to reload material bar.

Covers of any sort (guards etc.) must not be removed or disabled during operation of the loading magazine. This also applies to all parts of the covers that are not electrically monitored or permanently bolted in position.

During the loading magazine operation, it is not allowed to reach through the loading aperture. Risk of personal injury!
0.7.2 Guide tube/telescopic tube between loading magazine and auto lathe

0.7.2.1 Auto lathe with movable spindle stock

Before commissioning, the specified guide tube/telescopic tube shall be mounted in between the auto lathe spindle and the loading magazine. During loading magazine operation, the guide tube/telescopic tube must be present.

Movable spindle stock auto lathes must not be operated without telescopic tubes or fixed spindle reduction projecting from the loading magazine into the spindle of the auto lathe.

Assemble the telescopic tube as described in the drawing enclosed. This drawing can be requested from FMB by stating the respective order number.

Attention!

See section 5.1.5 ‘Spindle reduction’

The guide tube/telescopic tube bridges the distance between the loading magazine’s front end and the spindle end of the auto lathe. It serves as a protective cover and prevents rotating parts from being ejected.

The guide tube’s inner diameter depends on the pusher built-in. When installing the loading magazine, the guide tube’s length must be taken into account (see sect. 3). It shall be specified such that there is a distance of 5 mm at max. between the end of the auto lathe spindle and the front end of the guide tube or such that the tube projects into the auto lathe spindle. This gap must not be within operator’s reach!

Fixed spindle reduction:

Should assembly of a telescopic tube be impossible, the auto lathe can be operated with a fixed spindle reduction. To this effect, the guide tube of the loading magazine as contained in the capacity adjustment set is slid into the spindle. Thus, maximum possible bar diameter is restricted.

The following should be noted:

- The guide tube’s outer diameter must be 1 to 2 mm smaller than the spindle’s inner diameter.
- Guide tube length must be specified such that it bridges the gap between loading magazine and spindle, whilst excluding any potential spindle destruction.
- The guide tube’s inner diameter must be 2 mm bigger than the diameter of the pusher built-in.
- The smallest wall thickness of the guide tube should be 2 mm at least.
0.7.2.2 Auto lathe with fixed spindle stock

Before commissioning, the specified guide tube shall be mounted in between the auto lathe spindle and the loading magazine. During loading magazine operation, the guide tube must be present.

The guide tube bridges the distance between the loading magazine's front end and the spindle end of the auto lathe. It serves as a protective cover and prevents rotating parts from being ejected.

The guide tube's inner diameter depends on the pusher built-in. When installing the loading magazine, the guide tube's length must be taken into account (see sect. 6.9.4.3).

It shall be specified such that there is a distance of 5 mm at max. between the end of the auto lathe spindle and the front end of the guide tube or such that the tube projects into the auto lathe spindle. This gap must not be within operator's reach!

0.7.3 Emergency Stop device

As required by DIN EN 60204 (VDE 0113), an Emergency Stop system is fitted to the loading magazine. The Emergency Stop relay -K70 is disconnected by pressing the Emergency Stop key -S69 on the control panel. -K70 disconnected the 24 V DC power supply to all PLC outputs. The safety relay -K20 and the contactor -K21 are also switched off. Via the -K21 contactor the voltage supply for the drive motor is switched off. The motor and thus the pusher cannot carry out any movements.

The error message appears on the control panel:

FAULT:
EMERGENCY STOP LOADING MAGAZINE -S69

The second switch contact of the Emergency Stop relay -K70 transmits the Emergency Stop message to the automatic lathe, where it must be processed in accordance with the specifications.

If an Emergency Stop key is pressed on the automatic lathe, the loading magazine controller must also be switched off.

The error message appears on the control panel:

FAULT:
EMERGENCY STOP LATHE

0.7.4 Guards on the lathe

If a "GUARD CLOSED" contact is fitted to the lathe, the power supply to the contactor -K22 is switched off when this contact is opened.

The -K22 contactor switches on the controller inhibit for the servo drive via two contacts. This means that movement of the pusher with the material bar is no longer possible. The risk of personal injury from the material bar in the lathe workshop while the guard is not closed can safely be ruled out.
0.8 Safety instructions for working with the portable control panel

At regular intervals (6 months) the emergency stop key must be checked to ensure it is working properly. The loading magazine must be switched off on actuation of the emergency stop key.

- The housing of the control panel must not be opened (with the exception of the connection shaft), as when opened the control panel is susceptible to electrostatic discharge.
- The connection shaft should only be opened with the supply voltage off, otherwise components could be damaged or undefined signal states arise.
- Care must be taken to ensure that the control panel cable is not pinched by objects, which may damage it.
- The cable guide must not be laid over sharp edges that may abrade the cable sheath.
- The cable must be laid so that no-one can trip over it and cause the control panel to fall to the ground.
- The control panel must not be placed on unstable surfaces or supports. It may fall and be damaged. After use it should be placed in the holder provided.
- The control panel must not be placed on the operating side, as it could cause mechanical damage to the control elements.
- Do not place the control panel in direct sunlight or other heat sources.
- Do not place the control panel where there are mechanical vibrations, excessive dust, moisture or strong magnetic fields.
- Do not clean the housing, control panel or operating elements with solvent, abrasives or scouring pads. Only clean with a soft cloth, slightly moistened with water or a mild cleaning agent.
- Take care to ensure that debris or liquids do not enter the inside of the unit. The unit’s protective covers and cable feeds should be checked for damage at regular intervals. The screw fixings of the housing must be checked for completeness.
- If the control panel is subjected to a sharp impact (e.g. if it is dropped), the emergency stop key must be checked to ensure it is working.
1. Technical data and operating material

1.1 Technical data / Storage conditions

Material aperture in guide channel: turbo 26 - max. 26 mm
                                      turbo 36 - max. 36 mm

Power consumption: 1,5 KW

Feed force: max. 550 N (infinitely variable)

Insertion speed: adjustable from 0 to 520 mm/s

Feed speed: adjustable max. 700 mm/s

Return speed: 1000 mm/s

Remnant length: max. 450 mm

Dimensions: see installation chart, section 3

Weight:

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<tr>
<th>Model</th>
<th>Length (mm)</th>
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<td>Turbo 3-36</td>
<td>6200</td>
<td>1500</td>
</tr>
<tr>
<td>Without oil filling, packaging and material</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Loading time: approx. 26 s (for 3200 mm bars)

Oil filling: 80 l oil, viscosity: 150 cSt at +40°C Celsius
(not included in scope of delivery)

Operating conditions:
• Ambient temperature range from +15°C to 40°C (dictated by the viscosity of the oil).
• Relative humidity from 30% to 75% (non-condensing).
• The elevation must not exceed 1000 m above M.S.L.

Storage conditions:
The loading magazine must only be stored in a dry area with an ambient temperature of -20°C to +65°C.

Operating voltage: 400 V / 50 Hz standard version (200 V on request). according to DIN EN 60204 (VDE 0113), the continuous operating voltage must be 100 % ± 10% of the mains voltage. The frequency must be between 0.99 and 1.01 of the rated frequency.

Control voltage: 24 V DC

Compressed air supply: min. 0.6 MPa (6 bar) – max. 1.0 MPa (10 bar)

Compressed air consumption: approx. 10 liters per loading action and approx. 0.5 liters per double stroke of steady rest

Noise level: max. 48 ± 5 dB(A) (during bar change)
1.1.1 Technical data bundle loader (option)

**Bar diameter:** Ø min. 18 - max. 36 mm  
Profile material on request

**Bar lengths:**  
- 2200 mm – max. 2200 mm  
- 3200 mm – max. 3200 mm  
- 3800 mm – max. 3800 mm  
- 4200 mm – max. 4200 mm  
- 4775 mm – max. 4775 mm  
- 5300 mm – max. 5300 mm  
- 6200 mm – max. 6200 mm

**Capacity:** 2,5 t

**max. bundl diameter:** 400 mm

**Insertion accuracy:** Bar end max. 250 mm from rear limiting plate

**Drive motor:** Geared motor with brake  
- 230 V/ 3,5 U/min; 50 Hz; 0,25 kW  
- 400 V/ 4,3 U/min; 60 Hz; 0,25 kW

**Control:** by FMB loading magazine

**Weight bundle loader:**  
- 2200 mm – 650 kg (empty, without pallet)  
- 3200 mm – 750 kg (empty, without pallet)  
- 3800 mm – 780 kg (empty, without pallet)  
- 4200 mm – 800 kg (empty, without pallet)  
- 4775 mm – 880 kg (empty, without pallet)  
- 5300 mm – 940 kg (empty, without pallet)  
- 6200 mm – 1100 kg (empty, without pallet)

**Weight pallet:** approx. 300 kg
1.2 Electrical connection between loading magazine and automatic lathe

Details of the electrical connections and voltage supply of the loading magazine are given in the electrical documentation. Electrical connections must be carried out by an authorized electrician; the VDE (German) and local regulations must be strictly observed, particularly with regard to safety measures.

1.3 Oil filling

The operator has be aware of the ‘Technical Instructions on Hazardous Matters’ and respective specification sheets of the applied oil and to observe them.

Oils conforming to the specifications of

- DIN 51 517–2 CL 150
- DIN 51 506 VBL 150
- DIN ISO 3448 ISO VG 150 are prescribed.

We recommend the following oils:

<table>
<thead>
<tr>
<th>Hersteller</th>
<th>Öl/Oil/Huile</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARAL</td>
<td>Motanol HE 150</td>
</tr>
<tr>
<td>MOBIL/ESSO</td>
<td>Vacuoline 128</td>
</tr>
<tr>
<td>SHELL</td>
<td>Morlina 150</td>
</tr>
</tbody>
</table>

Note:
Results with polygonal material can be improved by using oil with a viscosity of 220 cSt at 40°C. Oil change intervals depend on the degree of contamination. The statutory requirements for disposing of waste oil must be complied with.
1.4 Requirements for the material bars and their preparation

The straightness of the bars influences the achievable speeds to a very great extent. With profile materials, speed limitations must be expected.

The speed of rotation that can be achieved with the material bars depends on their material accuracy. The negative influence of untrueness increases as the diameter increases. Apart from straightness, ovality and imbalance also affect the achievable speed. Deviation from straightness should not exceed a tolerance of 0.5 mm per metre. The unit of measure "mm per metre" refers to an even curvature over the stated measured length of 1 metre, and on no account to a short kink within a length of one metre.

• The start of the bar must be burr-free for automatic insertion of the material bar into the lathe spindle and collet. This is necessary as the collets only open a few millimetres.

• The bar end must not be bent or distorted by the cutting process.

• Bars must not be contaminated by swarf, sand etc.

• Square or hexagonal bars, on the other hand, does not require an all-round chamfer for automatic insertion into the collet, but must have a flat end surface which is sawn, turned or cleanly sheared off.
Pointing or chamfering of bar ends with circular cross sections is generally not necessary, since the bar is lifted to the center of the pusher by the gripper and securely pressed into the clamping sleeve through the insertion taper. Chamfering or pointing of the bar end is, however, advisable for bar diameters approximating to the diameter of the pusher, where the thin-walled clamping sleeve no longer has an insertion taper.

Bar diameter considerably smaller than pusher diameter

Bar diameter approximating to pusher diameter

If the guide channel is to be used to its full capacity, the ends of the material bars must be turned down to allow them to be held by the clamping sleeve. It must be noted here that the pusher can never be larger than the maximum bar diameter to be machined by the lathe (see section 7.6.2.1).

**Standard guide channels**

<table>
<thead>
<tr>
<th>usable in turbo</th>
<th>Bar capacity D</th>
<th>Permitted bar dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Round Ø</td>
<td>Hexagonal AF</td>
</tr>
<tr>
<td>26/36</td>
<td>13 (15)</td>
<td>AF 10</td>
</tr>
<tr>
<td>26/36</td>
<td>22 (25)</td>
<td>AF 19</td>
</tr>
<tr>
<td>36</td>
<td>28 (32)</td>
<td>AF 24</td>
</tr>
<tr>
<td>36</td>
<td>32 (36)</td>
<td>AF 28</td>
</tr>
</tbody>
</table>

() Size for turning down the bar end
Other channels (special types) on request
1.5 Speed limitations

The maintenance work stated in section 11.1 is to be done regularly. The possible speed must be set in such a way that damage to engineering and persons is ruled out. In cases of danger, the system must be switched off. It may only be put back into operation after a complete remedy of the cause. If the possibilities on site are not sufficient, consult an expert (FMB service engineer).

The loading magazine cannot be run at the full speed of the auto lathe in all situations.

**Speed limitations can become necessary for the following reasons:**

- Bent bars
- Incorrect choice of guide channel
- Incorrect choice of guide jaws
- Use of coolant lubricants with a viscosity <150 cSt in the loading magazine
- Use of centering sleeves
- Material to be processed (e.g. copper, aluminium)
- Pipes with uneven wall thickness
- Pipes without stoppers (imbalance due to coolant lubricants and chips in the pipe)
- Profile material
- Exceeding the max. admissible sound level of 80 dB(A)
- Danger for persons and engineering
- Work without rotating spindle reduction

Please remember that negative factors add up.
2. Transport for setting up and dismantling

**Attention!**

The lifting and transport equipment used must comply with current regulations. No persons are allowed within their swivel and operating range.

The operators of the lifting and rigging equipment must have the necessary qualifications.

The loading magazine is originally supplied by FMB attached to a pallet for transport purposes:

<table>
<thead>
<tr>
<th>Length</th>
<th>Palett draw.-no.</th>
<th>Ident-no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2200</td>
<td>23-2129-3724-D</td>
<td>2056-326</td>
</tr>
<tr>
<td>3200</td>
<td>23-2128-3153-D</td>
<td>2026-757</td>
</tr>
<tr>
<td>3800</td>
<td>23-2129-3725-D</td>
<td>2056-327</td>
</tr>
<tr>
<td>4200</td>
<td>23-2128-3155-D</td>
<td>2026-759</td>
</tr>
<tr>
<td>4775</td>
<td>23-2129-3792-D</td>
<td>2058-010</td>
</tr>
<tr>
<td>5300</td>
<td>23-2129-3792-D</td>
<td>2058-010</td>
</tr>
<tr>
<td>6200</td>
<td>23-2129-3831-D</td>
<td>2060-144</td>
</tr>
</tbody>
</table>

Every support is linked with the pallet by means of 2/4 10x80 DIN 571 hexagonal wood screws and 2/4 A10.5 DIN 9021 washers. The pallet must not be removed, unless the loading magazine has been placed behind the auto lathe.

The condition of transport equipment and routes must be such that damage to property or injury to persons cannot occur. These must be checked before transport, if necessary.
2.1 Preparation of the loading magazine for transport

The following work must be carried out:

1. Remove any material bar from the unit. (storage and channel must be empty).
2. Move pusher backwards as far as it will go.
3. Loosen the synchronizing bar from the spindle head (only on long lathe).
4. Leave the loading magazine standing for at least 8 hours to allow the oil to drain completely into the oil reservoir.
5. Turn auto lathe main switch off.
6. The electrical connection to the automatic lathe, all electrical connections from the loading magazine to the control cabinet and the connection cable of the oil pump must be disconnected by specialized personnel (loosen plug-in connection).
   **Attention!** The oil reservoir should be transported separately.
7. Empty the oil reservoir and dispose of oil with due regard to the legal specifications. Disconnect the connecting hoses for oil supply and oil return. Disconnected oil hose connections must be secured against the loss of residual oil.
8. Depressurize compressed air supply to the loading magazine (branch valve, main valve etc.)
9. Vent the loading magazine by closing the shut-off valve on the maintenance unit.
10. Suspend the switch cabinet on the beam and fit it on the gib provided with 4 cylinder screws, M 8x20 DIN 912, and 4 Nord Lock washers (see point 2.1.1).
11. Loosen floor attachments (remove the hexagonal nuts of the UPAT plugs).
12. Attach the parts supplied by the loading magazine manufacturer for crane transport (see section 2.2) and dismantle all connections between the loading magazine and fixed parts.
13. Lift the loading magazine with the help of a crane (see section 2.2).
14. If the loading magazine is to be transported by means other than a crane, it must be placed on a pallet supplied by the loading magazine manufacturer and firmly attached to the pallet by at least 4/8 hexagonal wood screws M10 x 80 DIN 571 and 4/8 washers A 10,5 DIN 9021 through the existing anchor holes in the support base plates.
15. Immediately after the loading magazine has been lifted, the plugs protruding from the floor must be cut off at floor level by suitable means, or removed from the floor (risk of tripping)
2.1.1 Transport of the switch cabinet

**Attention!** If the switch cabinet remains on the beam during the operation of the loading magazine, FMB assumes no liability for damage occurring to the control unit.

The switch cabinet weighs 100 kg. Suitable lifting equipment is to be used to lower it.

The switch cabinet is only fitted to the beam of the loading magazine for transport. Before start of operation, it must be placed on the floor in order to avoid damage to the electronic parts of the controls by vibrations.

**The following steps are necessary:**

1. Support the switch cabinet with suitable lifting equipment (e.g. elevating truck, fork-lift truck)
2. Loosen 4 cylinder screws, M 8x20 DIN 912
3. Move the switch cabinet to the side and dismount it
4. Carefully lower the switch cabinet and place it on the floor.

2.2 Transport by crane

Before the loading magazine is raised, it must be ensured that it has been prepared in accordance with section 2.1 and that there are no persons in the hazard zone. The parts supplied are designed only for the specified load cases.

Only rigging material suitable for the specified loads and conforming to the regulations may be used. It must be attached as shown on the transport drawing.

The increased weight must be taken into consideration when transporting the loading magazine by crane with the FMB pallet attached to the magazine (the weight of the pallet is approx. 300 kg). The FMB pallet must be attached in accordance with section 2.1.

The rope’s stop points are shown in the transport drawing. The transport beams draw.-no 23-2129-3070-D (ld.-Nr. 2050-821) supplied by FMB must be mounted as shown on the transport drawing. After installation of the magazine the transport beams must be removed.

The oil reservoir should be transported separately. Therefore the plug for the oil pump needs to be removed from the switch cabinet. The connection hoses for the oil forward and return flows must also be disconnected.
Transport drawing

transport beam
2050-821
2.3 Transport by forklift

For transport by forklift truck, the loading magazine should be prepared in accordance with section 2.1 and fixed, depending on size, on a pallet as mentioned under section 2. Pallets can be obtained from loading magazine manufacturer.

The fork should be positioned under the load’s center. If necessary, the center should be determined anew in order to prevent the load from slipping away. During transport, no personnel shall stay within the dangerous area.

Mind the weights to be lifted (see section 1.1).

For transport, determine the load center and burden front part, if needed.
Fix magazine on pallet with 4/8 wood screws 10x80 DIN 571 and 4/8 washers A10,5 DIN 9021.

pay attention to center of gravity!

fork spacing at maximum
2.4 Transport by other means

Except when being transported by crane the loading magazine must be placed on a FMB-pallet and prepared and fastened in accordance with section 2.1.
A pallet can be ordered from FMB.
For transport by mobile means of transport, (e.g. lorry, container, ship) the pallet with the loading magazine must also be secured against forces of inertia.
There must not be any persons in the hazard zone during transport.
2.5 Transport bundle loader (option)

For transport purposes, the bundle loader is attached to a separate wooden pallet, separate from the loading magazine. The bundle loader is connected to the pallet with four M 10 threaded rods. The pallet ensures safe transport and must not be removed until the installation site has been reached.

**Crane transport:**

![Diagram of crane transport]

**Forklift truck transport:**

To prevent toppling, the bundle loader must be attached to the forklift truck.

![Diagram of forklift truck transport]

**Note:**
The weights to be lifted must be taken into account (see section 1.1.1)
3. Installation

3.1 Installation plan

Turbo 3-26 variant A; D

- View of boring for UPAT-anchors
- UPAT-anchor EXA M12x35
- GVZ (2031-357)
- Drill holes when installing
- Pusher 1466: 1278
- Pusher 1666: 1478
- Centre of channel
- Attention! Switch cabinet must be placed on the floor before start operation
- Dimensions subject to alterations!

Note: Dimensions subject to alterations!
Attention! Switch cabinet must be placed on the floor before start operation.

Dimensions subject to alterations!
Attention! Switch cabinet must be placed on the floor before start operation.

Dimensions subject to alterations!

<table>
<thead>
<tr>
<th>Support</th>
<th>Center Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>2059-116</td>
<td>790 - 965</td>
</tr>
<tr>
<td>2059-117</td>
<td>965 - 1215</td>
</tr>
<tr>
<td>2059-118</td>
<td>1215 - 1470</td>
</tr>
</tbody>
</table>

Compressed air supply 6 bar

UPAT-anchor EXA M12x35 GVZ (2031-357) drill holes when installing.

Dimensions subject to alterations!
turbo 3-36 variant A:D with shifting device

stroke of the shifting device

stroke

front edge steady

pusher extended at maximum

front edge beam

Dimensions including beam top (5 mm)

support
center height

2059-116 814-989
2059-117 989-1239
2059-118 1239-1494

UPAT-anchor EXA M12x35 GVZ (2031-357)
drill holes when installing

Attention! Switch cabinet must be placed on the floor before start operation

Dimensions subject to alterations!
Dimensions subject to alterations!
turbo 3-36 variant B:C with shifting device

Dimensions subject to alterations!

Compressed air supply 6 bar

Attention! Switch cabinet must be placed on the floor before start operation

Dimensions including beam top (5 mm)

Front edge steady

Front edge beam

Dimensions including beam top

Pusher 1866: 1478
Pusher 1466: 1278
Pusher extended at maximum

View of boring for UPAT-anchors

UPAT-anchor EXA M12 x 35 GvZ (2031-357) drill holes when installing

Center of channel

Center of bar

Front view M1:6

Synchronized bar

Bar top at bar change

Attention! Center height see table

Dimensions subject to alterations!
3.2 Installation plan with bundle loader (option)
turbo 3-36 variant A; D

Dimensions for loading magazine see page 30!
turbo 3-36 variant B; C

Dimensions for loading magazine see page 32!

ATTENTION!
Center height limited by bundle loader.
1030-1180

Dimensions subject to alterations!

front edge steady 1 - UPAT-anchor M12
2 - anchor bolts EA M8

center height

<table>
<thead>
<tr>
<th>support</th>
<th>center height</th>
</tr>
</thead>
<tbody>
<tr>
<td>2059-116</td>
<td>790 - 965</td>
</tr>
<tr>
<td>2059-117</td>
<td>965 - 1215</td>
</tr>
<tr>
<td>2059-118</td>
<td>1215 - 1470</td>
</tr>
</tbody>
</table>
**Attention!**
Switch cabinet must be placed on the floor before start operation.

**UPAT-anchor EXA M12x35 GVZ**
(2031-357) drill holes when installing.

**Dimensions subject to alterations!**
Dimensions subject to alterations!
3.3 Condition of the floor

For data of the automatic lathe, please refer to the documentation. The building intended for the installation of the loading magazine must be designed to take the loads that occur. The possible dead loads and operating loads from the loading magazine in conjunction with the automatic lathe must be taken into account. Ready for operation, the loading magazine weighs:

- **turbo 3-26** loaded with ∅26 / 2200 long weight approx. 700 kg
- **turbo 3-26** loaded with ∅26 / 3200 long weight approx. 900 kg
- **turbo 3-26** loaded with ∅26 / 3800 long weight approx. 1100 kg
- **turbo 3-26** loaded with ∅26 / 4200 long weight approx. 1300 kg
- **turbo 3-26** loaded with ∅26 / 4775 long weight approx. 1450 kg
- **turbo 3-26** loaded with ∅26 / 5300 long weight approx. 1600 kg
- **turbo 3-26** loaded with ∅26 / 6200 long weight approx. 2000 kg
- **turbo 3-36** loaded with ∅36 / 2200 long weight approx. 800 kg
- **turbo 3-36** loaded with ∅36 / 3200 long weight approx. 1000 kg
- **turbo 3-36** loaded with ∅36 / 3800 long weight approx. 1200 kg
- **turbo 3-36** loaded with ∅36 / 4200 long weight approx. 1400 kg
- **turbo 3-36** loaded with ∅36 / 4775 long weight approx. 1550 kg
- **turbo 3-36** loaded with ∅36 / 5300 long weight approx. 1700 kg
- **turbo 3-36** loaded with ∅36 / 6200 long weight approx. 2100 kg

Option:
- **Bundle loader with max. loading capacity / 2200 long** weight approx. 3150 kg
- **Bundle loader with max. loading capacity / 3200 long** weight approx. 3250 kg
- **Bundle loader with max. loading capacity / 3800 long** weight approx. 3280 kg
- **Bundle loader with max. loading capacity / 4200 long** weight approx. 3300 kg
- **Bundle loader with max. loading capacity / 4775 long** weight approx. 3370 kg
- **Bundle loader with max. loading capacity / 5300 long** weight approx. 3440 kg
- **Bundle loader with max. loading capacity / 6200 long** weight approx. 3600 kg

The building must be suitable for installing the unit. An expert must be consulted in case of doubt. Lines of any kind (power, water and other lines) must not be installed underneath the loading magazine.
3.4 Aligning the loading magazine

As alignment of the loading magazine is crucial for correct functioning, it is recommended that this work should be carried out by experienced FMB service technicians. Commissioning of the loading magazine must be carried out in accordance with section 5.

The loading magazine must be set up in such a way that the center line of the lathe spindle is exactly in line with the center line of the pusher. If these are not in line, the operation of the loading magazine will present problems (seizure of the pusher with the spindle; severe vibration; damage to the lathe spindle).

The following work must be carried out:

1. Lift the loading magazine from the pallet (see section 2).
2. Rough lateral alignment of the center of the loading magazine.
3. Rough levelling with the help of the M 20 threaded spindle on the supports. To do this, loosen the M 10 screw on the clamping flanges and retighten when the required height is reached. The M 16x60 DIN 916 set screws (4 per support) can be used to compensate for any unevenness of the floor. The set screws must be located in the supplied foot plates.
4. Mount the capacity adjustment set.
5. The magazine should be set up longitudinally as close as possible behind the lathe. It must be ensured that the material bar is pushed out from the loading magazine by the distance "x" before the pusher is mounted (turning operation not yet possible). The material bar must not yet be inserted into the clamping system of the lathe and must not rotate with it, because the gripper blades close in order to mount the pusher. This could otherwise lead to damage to the loading magazine and the lathe (see diagram on next page).
6. Fine adjustment of the magazine, preferably by using optical equipment from Messrs. Breithaupt in Kassel. To do this, the pusher must be accurately aligned in its forward and rear positions.
7. Assembly of the guide tube/telescopic tube as enclosed in the loading magazine manufacturer's delivery between the magazine and the auto lathe.
8. For pusher stop assembly see sect. 3.10.
9. In the case of long-turning automatic lathes, the synchronizing bar also needs to be fixed to the spindle head (see section 3.11).
Turbo 3-26 series 7
3-36 series 5

Spindle head fully retracted
Extended material bar before mounting

Dimension X min. 770 mm
3.5 Fixing to the floor

Load-bearing parts of building structures and other equipment must not be damaged by the anchors.

Before starting to drill the holes for the anchors, check the floor for utility lines (electric cables, water, gas lines etc.). These must not be affected by the drilling. Consult an expert if necessary.

After alignment of the loading magazine with the lathe spindle (section 3.4) it must be attached to the floor at the relevant places with 4 anchor bolts M 12 (UPAT-anchor EXA M12 x 35 GVZ recommended).

Attention ! The fastening elements are not included in the scope of delivery.

Should other fixing methods be applied, the same effect as described above shall be ensured.

3.6 Compressed air supply

The connecting line must be installed so as to avoid any risk of injury to persons or damage to property.

The compressed air is connected to a 1/4" hose nozzle on the maintenance unit of the loading magazine. A shut-off valve must be installed upstream of the loading magazine. The compressed air connection must satisfy the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure</td>
<td>0,6 MPa – 1,0 MPa</td>
</tr>
<tr>
<td>Compressed air consumption:</td>
<td>approx. 10 liters per loading action</td>
</tr>
<tr>
<td></td>
<td>approx. 0.5 liters per double stroke of steady rest</td>
</tr>
</tbody>
</table>

The air must be dry and filtered.
3.7 Electrical connection

Attention!
Check the interface in accordance with the documentation of the automatic lathe, the FMB electrical documentation and the explanations under section 4 of these instructions.

Attention!
The correct functioning of the Emergency Stop device and electrically monitored covers must be checked before initial commissioning. (see sections 0.7.1 and 0.7.3)

The oil pump must rotate in the direction of the arrow on the ventilator cover. If the oil pump rotates in the wrong direction, no oil is pumped into the channel. The direction of rotation can be changed by reversing two wires in the power supply cable. To reverse the wires, switch off the main switch on the automatic lathe.

The electrical connection between the magazine and the automatic lathe is given in the enclosed documentation on page 3 (interface). The plug contact assignment and the operating voltage are determined by the automatic lathe and are already factory-set. According to DIN EN 60204 (VDE 0113), the continuous operating voltage must be 100 % ± 10% of the rated voltage. The frequency must be between 0.99 and 1.01 of the rated frequency. When the automatic lathe has been prepared for installation of the loading magazine, the direction of rotation of the oil pump should be checked after the electrical connection has been established.

3.8 Preventing hazardous confined spaces

The loading magazine must be installed in such a way that it is always accessible from all sides for maintenance, repair and other work. All control elements must be accessible and allow easy operation. It must be possible to open the control cabinet at all times. Machines or aggregates installed in the immediate vicinity must be taken into account. Risk of personal injury or damage to property must be ruled out during all work on the loading magazine.

3.9 Repairs to the automatic lathe

Adequate space must be available if more extensive repairs of the necessary quality have to be carried out on the lathe without endangering persons or property. This means that the loading magazine may have to be removed from its location. In this context, the transport and installation instructions (sections 2 and 3) must always be observed.
3.10 Front pusher stop

Prior to loading magazine commissioning, the pusher’s stroke to the front must be limited in order to prevent the bar from projecting into the working area of the auto lathe. It may be clamped or caused to rotate or collide with tools and moving machine parts such that damages to the loading magazine and auto lathe could be the consequence.

After having fixed and aligned the pusher, a stop is to be mounted in the carriage guide of the loading magazine for pusher stroke limitation.

The respective works are as follows:


2. Move the pusher with clamping sleeve into the collet of the automatic lathe by pressing the keys ⍟ and ⍊ at high speed or by pressing the key ⍺ at low speed.

3. With the key ⍑ retract the pusher by about 5 mm from the front end position. (see drawing next page).

4. Press the Emergency Stop key and close compressed air shut-off valve at the loading magazine in order to ventilate the unit.

5. Remove the rear cover on the side of the steady. (see drawing next page).

6. Loosen the stop (square nut) and push it up to the carriage.

7. Fasten the stop.

8. Mount the rear cover, unlock Emergency Stop key and open compressed air shut-off valve at the loading magazine in order to aerate the unit.

9. Press ⍔ in order to delete the “NO AIR PRESSURE -S11” fault message.
With long-turning automatic lathes (moving spindle head), the synchronizing bar must be fixed to the spindle head (see diagram).

3.11 Synchronizing device (option)

If the collet is open, the servomotor is actuated at low feed force, in order to hold the material bar in position when the spindle head is moved.

When the collet is closed, the servomotor is disconnected and -KY6 is actuated.

-KY6 is linked to the spindle head via the synchronizing toothed belt and rod. It is synchronized with the feed toothed belt and the attached pusher, without applying any pressure on the material bar.

Do not touch the moving synchronizing bar! Risk of crushing!
3.12 Attachment of the bundle loader (option)

The bundle loader must be correctly leveled!

Since correct alignment of the bundle loader is crucial for proper functioning, it is recommended that this work should be carried out by experienced FMB service technicians. The system must be commissioned in accordance with section 5.

The following operations must be carried out:

1. Lift the bundle loader from the pallet (see section 2.5)

2. Position the bundle loader in relation to the loading magazine, which has been aligned and secured in accordance with section 3.

3. Adjust the height using the hexagonal screws (M16x100) on the bundle loader feet. After adjusting the height, lock the screws to the bundle loader frame with hexagonal nuts and M10x20 lock screws

5. Plug connector -X27 into the jack of the control cabinet and connect the earth lead to the bundle loader.

6. Test separation, adjust if applicable.
4. Notes on the interface

Attention!

The standard circuit is adapted to the automatic lathe concerned. For relay and contact designations as well as plug pin assignment see electrical circuit diagram.

4.1 Contacts from the lathe to the loading magazine

- **Collet (clamping device) open:**
  The feed mechanism of the loading magazine is switched on with this contact.

- **End of program cycle, start bar change:**
  For automatic lathe with program jump, the contact should be ready in the bar starting program before "Collet open".

- **Automatic lathe ready for operation, release for automatic mode:**
  Only if this contact is available can the loading magazine be switched to automatic mode.

- **Pushing, Feed1 (option)**
  Via this contact, feed can be started for "PART LENGTH FOLLOW-UP" via M-order (only when selecting: "PART LENGTH EXTERNAL", see sect. 5.4.4).

- **Loading magazine on (option):**
  The automatic lathe can use this contact (pulse) to start the automatic mode of the loading magazine.

- **Guard closed:**
  Only if this contact is available a forward feed movement can be effected by the magazine.

- **Follow-up with SUB-spindle (option):**
  M-Order from automatic lathe. If this signal is put out before the collet opens (pushing order), the next follow up from "PART LENGTH INTERNAL / EXTERNAL" will be changed over to "PART FOLLOW-UP WITH SUB-SPINDLE".

- **Emergency stop automatic lathe:**
  Potential-free contact from automatic lathe. This contact is integrated into the emergency stop circuit of the magazine.
4.2 Contacts from the loading magazine to the lathe

- **No fault loading magazine (-K30):**
  No fault if contact is closed. If there is a fault, contact is opened. If a fault is signaled, the spindle of the automatic lathe must not be able to move.

- **End of bar change, program start (-K1):**
  Contact can be transmitted from the loading magazine as an impulse or as a permanent contact, depending on the automatic lathe control system. This is a signal to the automatic lathe that the bar has been inserted into the automatic lathe, or read-in enable, program start.

- **Bar end or program stop (-K9):**
  Contact can be transmitted from the loading magazine as a make or break contact, depending on the automatic lathe. This contact is made during processing of the last workpiece or after completion of processing of the last workpiece. This is a signal to the automatic lathe that the material bar has been finished.

- **Bar end long part (-K9.1) (option):**
  When working with two different part lengths, this signal is given at the end of the long part (enter long part under part length 1). If the signal "BAR END" (-K9) is not given yet, only short parts will be produced (enter short part under part length 2).

- **Automatic operation on (-K1M):**
  Contact is closed if the loading magazine is in automatic mode.

- **Pushing OK (-K44) (option):**
  This signal is given after the part length feed has been carried out and remains until the pushing signal (Collet Open) is removed. [This signal is only given when "PART LENGTH (INTERNAL)", "PART LENGTH (EXTERNAL)" and "COL OPEN-FIXED SPEED" is selected].
  When working with this option a value must be entered in the menu "PART" at "FEED" if "SELECT PART FOLLOW-UP: COL OPEN-FIXED SPEED".

- **Emergency stop loading magazine:**
  Potential-free contact from magazine. This contact must also be integrated into the emergency stop circuit of the automatic lathe.
4.3 Program suggestion for automatic lathe

**Parts program**

- Remove tools
- Collet open (signal to loading magazine)
- M-Order (wait for part length follow-up)
- Magazine pushes part length follow-up
- Acknowledgement M-Order (via Pushing OK,-K44 signal)
- Close Collet

**Processing**

- Magazine prescribes part length
  - Select: PART LENGTH INTERNAL or PART LENGTH EXTERNAL
- Automatic lathe prescribes part length
  - Select: COLLET OPEN-FIXED SPEED

- Remove tools
- Collet open (signal to loading magazine)
- Dwell-time (bars follow-up)
- Close Collet

**Enquiry bar end**

- Yes / No (-K9)
- Jump - bar starting program
- Start of parts program

**Bar starting program**

- Move turret into position
- Spindle speed (approx. 50 rpm. required for profile material)
- Collet open
- Signal start bar change (end of program cycle)
  - The automatic lathe must wait until the new material bar has been fed into it and the signal "-K1" is available.
- Close collet
- Cut off bar's front
- Return to parts program

**Attention !**

Example is only intended for information purposes!
5. Commissioning the loading magazine

5.1 Conditions for commissioning

**Attention !**

It is advisable to have commissioning carried out by the FMB Service Department.

The loading magazine must be in the original condition as delivered by FMB. All parts required for operation must be correctly fitted.

5.1.1 Fixing the loading magazine - work based on installation chart

Before commissioning, the loading magazine must be set up and secured in accordance with section 3.

5.1.2 Connection to the automatic lathe

The alignment and the distance between the loading magazine and the lathe (see section 3) must be checked. The electrical power supply cable must connected in accordance with the regulations (see section 3.7).

5.1.3 Supply media

The compressed air supply must be guaranteed (see section 1). The compressed air system of the loading magazine must be checked for leaks before commissioning. (Soap suds are suitable for this purpose)

There must be no pressure losses.

A pressure of 0.6 MPa must be set at the maintenance unit (see section 11.2).

The pressure switch -S11 triggers a fault message if the pressure falls to less than 0.4 MPa.

5.1.4 Oil filling

Before initial commissioning the oil reservoir must be filled with 80 l of one of the oil types specified in section 1.3.

Before starting filling, the oil reservoir must be checked for leaks.

The oil hoses and pipes fitted must not be kinked or blocked. The oil flow must not be obstructed.

The return lines must be installed with a steep gradient.

Before commissioning the oil pump must carry out a trial run (30 min.) during which the following items must be checked:

- Direction of rotation of the oil pump (reverse electrical connections in accordance with section 3.7 if required)
- Check the oil flow through the guide channel (must be completely flooded after a short time)
- Check the loading magazine for leaks, particularly during extension and retraction of the pusher, when the guide channel is full of oil.
- Check oil return to the oil reservoir.

When machining tube material cooling water must not get into the oil system of the loading magazine. Danger that the oil tank will be overflowing! Secure the tube end against the outflow of cooling water.
5.1.5 Spindle reduction

**Attention !**

If the diameter difference between the pusher and the interior diameter of the spindle (tension, pressure tube) or spindle reduction is smaller than 2 mm, you must expect the pusher to jam in the spindle.

In order to avoid damage to the lathe and the loading magazine, the interior diameter of the spindle or spindle reduction must be at least 2 mm larger than the diameter of the pusher installed in the magazine. Special solutions for smaller diameter differences can be inquired from FMB.

If smaller capacity adjustment sets are used, the spindle must be reduced as a matter of principle. Spindle reductions can be purchased from the manufacturer of the lathe and must have a removable fitting flange. Attention is to be paid to the fact that the spindle reduction can be changed with the loading magazine fitted.

5.1.6 Mechanical adjustment

Before commissioning, the following assemblies must be correctly set for the material to be processed.

- Steady rest (see section 7.2)
- Lateral material storage (see section 7.4)
- Guide channel (see section 7.6.4)

5.1.7 Training of staff / Study of the operating instructions

**Attention !**

It is advisable to have the staff instructed and trained by the FMB service department.

The staff responsible for operation must be trained before commissioning. The operating instructions form the basis for this. They must be studied carefully by every user.
5.2 Starting up the unit for the first time

1. Switch on the main switch at the automatic lathe.

2. It takes a few seconds for the FANUC PLC to start in RUN mode. Once the control system is ready, the control panel shows Manual Menu 1.

3. In the "SERVICE POSITIONS" menu the following settings must be made: "FIRST INSERT TRAVEL", "POSITION FRONT LIMIT", "TRAVEL INTERVAL ON" and "POSITION REVERSE ROTATION RETURN". To do this, the pusher and clamping sleeve are moved to the appropriate position using "FOW" or "BACK" in Manual Menu 1. The display shows the "CURRENT POSITION". This value must be entered in the "SERVICE POSITIONS" menu.

4. The steady rest and synchronized clutch functions can then be selected in the "SERVICE POSITIONS" menu.

5. At "PART LENGTH" in the "PART STANDARD" menu, the length of the part produced on the lathe must be entered in mm. This value is used by the PLC to calculate the bar end (see section 5.3.3). "FEED1" must be entered in menu "PART" under "PART LENGTH INTERN" or "PART LENGTH EXTERN". When the workpiece is clamped once, this value corresponds to the part length (see sections 5.4/5.5.2.1 etc.).

6. Option: Select or deselect the bundle loader / lift. (see section 6.2.1.3)

7. After switching to the Automatic menu, the steady rest can be selected as a guide "INHE", or the brake "BRAK", interval feed "INTV" or no gripper functions "W-OG" can be selected, depending on the application.

8. Using "S.1" or "S.17" the step where automatic mode is to be started is now selected. The step selected is shown in the display. Start at step 1 if there is a remnant or no material at all in the clamping sleeve. Start at step 17 if the material bar is in the lathe spindle and is still to be finished.

9. "AUTO" starts up automatic mode. The green LED in the key lights up.

10. If the bar change has been started without a remnant, the program continues without a fault message if the key is pressed in steps 1 to 4.

11. When the system is switched on at the beginning of work, you can continue working on the step which was being processed when the system was switched off.

12. Option: When the system is switched off in step 17, it can be started in step 17 again.
5.3 Starting up and shutting down the unit

5.3.1 Starting up the unit

The main switch on the automatic lathe must be switched on. When the automatic lathe is ready for operation, automatic loading magazine operation can be started with the key in the Automatic menu. The loading magazine then continues its operation in the step in which it was switched off. If any changes are carried out during shutdown, startup must be carried out in the sequence described under section 5.2.

5.3.2 Shutting down the unit

Attention ! Automatic operation should be shut down with the "AUTO" key, preferably after the material bar has been changed and several workpieces have been produced with the closed collet.

The unit is switched off at the automatic lathe. Automatic operation is automatically shut down after all available material bar has been used up or any protective equipment at the automatic lathe or loading magazine has been triggered.

5.3.3 Operation with the parts counter

In Manual Menu 1, select the "PART" menu with the key and then the "PART COUNTER" menu with the key.
By pressing the key, the “PART COUNTER DESIRED" value can be edited by inputting a number or using the keys. Editing is concluded using the key. Using the key to leave the "PART COUNTER" menu.

Start automatic operation; once the target value has been reached, the counter switches automatic operation off and the LED in the key flashes. Automatic operation cannot now be started until the actual value or the target and actual values have been reset.

Press the key in the "PART COUNTER" menu item to reset the actual value. Enter "0" or a new setpoint (0 = counter off) in the "PART COUNTER" menu item to reset the setpoint.
5.4 Settings on the controller

5.4.1 Setting the cut-off position (end of first insert)

1. From Manual Menu 1 switch to the "SERVICE" menu using "SERV".
2. In menu "SERVICE POSITIONS" under "FIRST INSERT TRAVEL" enter dimension E in mm. Dimension E is the distance from the switching flap of the starting switch -S7 to the cut-off position.
3. Then control the cut-off position in automatic mode.
4. If the position is not correct, enter a corrected value.

\[ X = \text{spindle stock travel} / \text{part length} \]
5.4.2 Setting interval feed for processing polygonal material

To improve the feed of polygonal material into the automatic lathe collet, the first forward feed movement of the material bar can be controlled in intervals. Here, the drive unit is switched on and off intermittently. The interval feed function is switched on with "INTV" in Automatic menu. The travel of the intermittent forward feed movement is entered in the menu "POSITIONS SERVICE" under "TRAVEL INTERVAL ON".

The start of the intermittent forward feed movement is computed by the PLC by subtracting the entered value from the cut-off position. Under "CYCLE TIME ON/OFF" in the "PART SELECT" menu, the start time and pause time of the forward feed movement can be entered.

In the "PART" menu under "SELECT INTERVAL FEED" the functions "WITH RETURN" or "WITHOUT RETURN" can be entered in the duration of "CYCLE TIME INTERVAL OFF". The time value is entered in tenths of a second.

\[
E = \text{First insert travel} \\
I = \text{Interval feed}
\]
5.4.3 Setting bar end values

Move the pusher with clamping sleeve forwards into the lathe collet. Enter the "CURRENT POSITION" shown on the display minus 3 mm at "POSITION FRONT LIMIT" in the "SERVICE POSITIONS" menu. Then enter the length of the part to be produced in "PART LENGTH" in the "PART STANDARD" menu. The PLC subtracts this length from the "POSITION FRONT LIMIT" to work out the bar end value.

If the bar end value is reached or exceeded in automatic mode in part follow-up, the step sequence switches to step 18. The bar end message is signaled to the lathe by the -K9 relay.

"POSITION FRONT LIMIT" does not need to be changed. The "PART LENGTH" value must always be adapted to the dimensions of the current part.

5.4.4 Setting the "POS. REVERSE ROTATION RETURN" value

During a bar change the pusher moves the remnant at low speed. The motor switches to a higher speed when the value set for "POS. REVERSE ROTATION RETURN" is reached.

The position at which the remnant left the lathe spindle must be determined. Enter the value which has been determined, under "POS. REVERSE ROTATION RETURN" in the "POSITIONS SERVICE" menu.
5.4.5 Setting of the Encoder -T4 for position determination spindle stock

1. Select Menu "PART" in the Manual Menu 1 with the F10 key and switch to "SPECIAL SETTINGS" menu.
2. Drive the spindle stock of the lathe into the rear end position.
3. Move the pusher with clamping sleeve behind the lathe steady.
4. Read the displayed current position of the pusher and enter them in the menu "PART SPECIAL SETTINGS" under "POSITION OPEN LATHE STEADY".
5. Select "SELECT ENCODER -T4: ON" in the "PART SELECT" menu.
6. Leave menu "PART" with the F7 key and select the menu "SERVICE" with key F11.
7. Check the value of the "-T4" position at menu "SERVICE CURRENT POSITIONS". The value must lie between +1.00 and 1.5 mm. If necessary, the position of the encoder must be corrected on the synchronizing bar.

**Setting of the Encoder -T4:**
1. Loosen cylinder screw M5 x 12
2. Turn toothed disk until value -T4 is reached
3. Tighten cylinder screw M5 x 12
5.5 Part length follow-up

In the menu "PART SELECT" there are several options for "SELECT PART FOLLOW-UP".

| SELECT PART FOLLOW-UP: COL OPEN-FIXED SPEED |

Selection options:

- COL OPEN-FIXED SPEED  ← Standard mode
- PART LENGTH INTERNAL
- PART LENGTH EXTERNAL (option)
- PART LENGTH INTERNAL + RETE
- PART LENGTH EXTERNAL + RETE

not applicable to long turning lathes!

Start editing by pressing the ➢ key. Select the function with the ‹ or ➤ key and accept by pressing the ➢ key again.

5.5.1 COL OPEN-FIXED SPEED (Standard mode)

Collet open: Motor runs at constant speed with
"SPEED FOR PART FOLLOW-UP" and
"FEED FORCE FOR PART FOLLOW-UP"

Collet closed: Motor stops
Feed force "0" when selected without BRAKE.
When selected with BRAKE the "FORCE BRAKE FUNCTION" is activated.

Operation: In this mode, the material bar must be collected.
5.5.2 PART LENGTH INTERNAL

Pay attention to initial setting section 5.5.9

5.5.2.1 Clamp part once

Input in PART menu e.g.:

<table>
<thead>
<tr>
<th>PART LENGTH:</th>
<th>100.00 mm</th>
<th>FEED1:</th>
<th>100.00 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEED2:</td>
<td>0.00 mm</td>
<td>FEED3:</td>
<td>0.00 mm</td>
</tr>
</tbody>
</table>

Collet open: After cut-off the material bar is pushed forwards 100 mm at every "Collet Open" (push) signal. Motor engaged with "FEED FORCE FOR PART FOLLOW-UP"

Collet closed: Motor stops
Feed force "0" when selected without "BRAKE". When selected with "BRAKE" the "FORCE BRAKE FUNCTION" is activated.

Operation: When this mode is selected, a limit stop is not used.

5.5.2.2 Clamp part twice

Input in PART menu e.g.:

<table>
<thead>
<tr>
<th>PART LENGTH:</th>
<th>100.00 mm</th>
<th>FEED1:</th>
<th>80.00 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEED2:</td>
<td>20.00 mm</td>
<td>FEED3:</td>
<td>0.00 mm</td>
</tr>
</tbody>
</table>

Collet open: After cut-off the material bar is pushed forwards 80 mm at the first "Collet Open" (push) signal. At the second "Collet Open" signal the material bar is pushed forwards 20 mm. "Collet Open" - counter jumps from 1-2-1-2 etc. Motor engaged with "FEED FORCE FOR PART FOLLOW-UP"

Collet closed: Motor stops
Feed force "0" when selected without "BRAKE". When selected with "BRAKE" the "FORCE BRAKE FUNCTION" is activated.

Operation: When this mode is selected, a limit stop is not used.
5.5.2.3 Clamp part 3 times

Input in PART menu e.g.:

<table>
<thead>
<tr>
<th>PART LENGTH:</th>
<th>100.00 mm</th>
<th>FEED1: 50.00 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEED2:</td>
<td>20.00 mm</td>
<td>FEED3: 30.00 mm</td>
</tr>
</tbody>
</table>

Collet open: After cut-off the material bar is pushed forwards 50 mm at the first "Collet Open" (push) signal. At the second "Collet Open" signal the material bar is pushed forwards 20 mm and at the third 30 mm. "Collet Open" - counter jumps from 1-2-3-1 etc.
Motor engaged with "FEED FORCE FOR PART FOLLOW-UP"

Collet closed: Motor stops
Feed force "0" when selected without "BRAKE".
When selected with "BRAKE" the "FORCE BRAKE FUNCTION" is activated

Operation: When this mode is selected, a limit stop is not used.

Note: The "Collet Open" - counter can be reset to Feed 1 by pressing the keys and at the same time.
5.5.2.4 Follow-up with sub-spindle when "PART LENGTH INTERNAL" is selected (option)

The auto lathe uses a M-function to switch the positioned follow-up in the loading magazine over to follow-up at steady motor speed. On the control panel, there are two additional input options in the "PART" menu available:

<table>
<thead>
<tr>
<th>FEED FORCE F.PART FOLLOW-UP SUB-SPINDLE:</th>
<th>30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPEED FOR PART FOLLOW-UP SUB-SPINDLE:</td>
<td>200 mm/s</td>
</tr>
</tbody>
</table>

M-order contact must be applying prior to the "Collet Open" signal.

Workflow:
- Open main spindle collet.
- Release pushing signal "Collet Open".
- The loading magazine, by means of a movement program, pushes the material bar forward in the auto lathe’s working space in compliance with the inputs made at the control panel.
- Upon reaching the position, the "Pushing O.K." (-K44) contact is switched on.
- Close main spindle collet.
- The "Collet Open" pushing signal will be switched off.
- The "Pushing O.K." (-K44) contact will be switched off.
- The auto lathe machines the part length pushed forward.

- The sub-spindle moves over the part.
- Close sub-spindle collet.
- Switch on "Follow-up with sub-spindle" M-function.
- Open main spindle collet.
- Release "Collet Open" pushing signal.
- The motor pushes the material bar at fixed speed with the sub-spindle moving back and guiding the bar’s front.
- As the sub-spindle has finished movement, the "Collet Open" pushing signal will be switched off.

Three positioned feeds by the loading magazine as well as several feed movements with sub-spindle/stop can be made per part each.
Diagram:

- Collet opened
- Pushing signal

- Contact
- Follow-up with sub-spindle/stop

- Feed motor
- Loading magazine

Contact: pushing o.k.

Process:
- Push to position
- Follow-up with sub-spindle/stop

Program:
- Proceeding program (feed 1)
- Fixed feed speed
5.5.3 PART LENGTH EXTERNAL (option)
(Only possible when the automatic lathe provides the signal)
Pay attention to initial setting section 5.5.9

Clamp part several times: Input in "PART" menu e.g.:

<table>
<thead>
<tr>
<th>PART LENGTH</th>
<th>FEED1</th>
</tr>
</thead>
<tbody>
<tr>
<td>100.00 mm</td>
<td>50.00 mm</td>
</tr>
<tr>
<td>20.00 mm</td>
<td></td>
</tr>
</tbody>
</table>

Collet open: When the "Collet Open" and "Feed 1 On" signals are given at the same time, the material bar is pushed forwards 50 mm. When the "Collet Open" and "Feed 2 On" signals are given at the same time, the material bar is pushed forwards 20 mm. When the "Collet Open" and "Feed 3 On" signals are given at the same time, the material bar is pushed forwards 30 mm. Motor engaged with "FEED FORCE FOR PART FOLLOW-UP"

Collet closed: Motor stops
Feed force "0" when selected without "BRAKE".
When selected with "BRAKE" the "FORCE BRAKE FUNCTION" is activated

Operation: When this mode is selected, a limit stop is not used.

5.5.4 PART LENGTH INTERNAL + RELIEVE TENSION

Function as with "PART LENGTH INTERNAL", see sect. 5.5.2. Additionally, after collet closing the feed motor is switched off for a short period of time in order to relieve the unit. This may be advantageous, if the collet crushes the material within the auto lathe.

5.5.5 PART LENGTH EXTERNAL + RELIEVE TENSION

Function as with "PART LENGTH EXTERNAL", see sect. 5.5.3. Additionally, after collet closing the feed motor is switched off for a short period of time in order to relieve the unit. This may be advantageous, if the collet crushes the material within the auto lathe.

5.5.6 PART LENGTH

The part length to be entered in the "PART" menu corresponds to the part length plus the cut-off with. In "PART LENGTH INTERNAL" the "PART LENGTH" must correspond to the sum of the feed values 1 to 3.
In "PART LENGTH EXTERNAL" the "PART LENGTH" must correspond to the externally triggered feed values per part.
5.5.7 Machining of 2 different part lengths (option)

When this option is selected the setting of two different part lengths at the control panel is possible.

<table>
<thead>
<tr>
<th>PART LENGTH 1: 200.00 mm</th>
<th>FEED 1: 200.00 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEED 2: 0.00 mm</td>
<td>FEED 3: 0.00 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PART LENGTH 2: 50.00 mm</th>
<th>FEED 1: 50.00 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEED 2: 0.00 mm</td>
<td>FEED 3: 0.00 mm</td>
</tr>
</tbody>
</table>

Part length 1 (long part) with possibility of entering
Part length 2 (short part) with possibility of entering

Two BAR END – contacts are reported to the automatic lathe.
Bar end of long part -K9.1
Bar end of short part -K9

Working process:
If during the follow-up of the part length the BAR END of the "PART LENGTH 1" (long part) is recognized, this is reported to the automatic lathe by relay -K9.1. The automatic lathe must still process this part (long part). During the follow-up afterwards the loading magazine slides the "PART LENGTH 2" (short part) forwards. The automatic lathe must carry out the part program for the short parts. If now during the follow-up the BAR END of the "PART LENGTH 2" (short part) is recognized, this is reported to the automatic lathe by relay -K9. The automatic lathe machines the last part and gives the signal "end of program cycle, start bar change".

If during the follow-up of the part length the BAR END of the "PART LENGTH 1" and the "PART LENGTH 2" is recognized simultaneously, the bar change is started after the last long part is machined.

When working with only one part length, this is entered at "PART LENGTH 1" and "0" at "PART LENGTH 2".
5.5.8 Acceleration and stop ramps

The acceleration ramps can be entered in the "PART" menu under "STANDARD SETTINGS" and in the "SERVICE" menu under "ACCELERATION". Acceleration ramps of up to 1000mm/sec² can be entered depending on the load (material).

**Attention !** The acceleration rates given in the table can only be set with XT clamping sleeves. If no XT clamping sleeves are used, tool breakage or damage to the automatic lathe may result.

### Round material

<table>
<thead>
<tr>
<th>Diameter (mm)</th>
<th>max. acceleration (mm/s²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 - 32</td>
<td>1000</td>
</tr>
</tbody>
</table>

### Square material

<table>
<thead>
<tr>
<th>width across flats (mm)</th>
<th>max. acceleration (mm/s²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 - 29,9</td>
<td>1000</td>
</tr>
<tr>
<td>30 - 32</td>
<td>800</td>
</tr>
</tbody>
</table>

### Hexagonal material

<table>
<thead>
<tr>
<th>width across flats (mm)</th>
<th>max. acceleration (mm/s²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 - 32</td>
<td>1000</td>
</tr>
</tbody>
</table>
5.5.9 Basic setting when selecting PART LENGTH INTERNAL and EXTERNAL (option)

**FEED FORCE FOR PART FOLLOW-UP:** 100%
**SPEED FOR PART FOLLOW-UP:** min. 400 mm/sec
**ACCELERATION PART FOLLOW-UP:** between 400 - 1000 mm/sec²  
(With large material bar and clamping sleeve with low hold force Setting: 400 mm/sec²)

<table>
<thead>
<tr>
<th>MIN. PART LENGTH FOLLOW-UP:</th>
<th>19.9 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part length minus 0,1 mm</td>
<td></td>
</tr>
<tr>
<td>e.g. part length 100 mm: 99,9 mm</td>
<td></td>
</tr>
<tr>
<td>With multiple part length follow-up per part enter shortest value minus tolerance.</td>
<td></td>
</tr>
<tr>
<td>e.g.: PART LENGTH: 100.00 mm FEED 1: 50.00 mm</td>
<td></td>
</tr>
<tr>
<td>FEED 2: 20.00 mm FEED 3: 30.00 mm</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAX. PART LENGTH FOLLOW-UP:</th>
<th>50.2 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part length plus 0,2 - 0,3 mm</td>
<td></td>
</tr>
<tr>
<td>e.g. part length 100 mm: 100,2 mm</td>
<td></td>
</tr>
<tr>
<td>With multiple part length follow-up per part enter shortest value plus tolerance.</td>
<td></td>
</tr>
<tr>
<td>e.g.: PART LENGTH: 100.00 mm FEED 1: 50.00 mm</td>
<td></td>
</tr>
<tr>
<td>FEED 2: 20.00 mm FEED 3: 30.00 mm</td>
<td></td>
</tr>
</tbody>
</table>

**Important notes:**
- If the error message **FAULT: PART FOLLOW-UP TOO SHORT** appears during part follow-up, the push time may be too short.
  Remedy: Give longer pushing signal at automatic lathe (enter dwell time)
- If clamping sleeves with low axial holding force are used for material bars of large diameter, the material bar may slip out of the clamping sleeve if the acceleration ramp is too steep.
  Remedy: Use XT clamping sleeves or reduce acceleration ramp.

For traverse times for "PART LENGTH FOLLOW-UP", please refer to the following table.

**Example:** Part length: 100 mm  
Feed speed: 400 mm/sec  
Acceleration: 400 mm/sec²  
Traverse time according to table is:  
1 second plus reaction time of 0.1 second = 1.1 seconds

In this example, the pushing signal from the automatic lathe (Collet open) must be given for 1.1 seconds for "PART LENGTH FOLLOW-UP".
### Table for traversing programs
(traversing time only, without controller reaction time, reaction time approx. 0.1 sec)

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<th>Traversing time in sec for acceleration of:</th>
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Table for traversing programs
(traversing time only, without controller reaction time, reaction time approx. 0.1 sec)

Feed rate: 600 mm/sec

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### 5.6 Parameter list

This list gives the standard parameters. After installing the loading magazine as described in sections 5.3 to 5.4.10, determine the values marked *, and enter them in the control panel and in the following list. How to enter values at the control panel is described under section 6.2.

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</tbody>
</table>

### Notes
- Variant 10: 4775
- Variant 9: 6200
- Variant 8: 5300
- Variant 7: 2200
- Variant 6: 2200

### Values
- Actual Values
- Standard Values

### Additional Information
- *FIRST INSERT TRAVEL*
- *POSITION REAR LIMIT*
- *POSITION MATERIAL DRAW OFF*
- *POSITION OPEN STEADY*
- TRAVEL INTERVAL
- *POS. REVERSE ROTATION RETURN*
- LIMIT POSITION SHORT PUSHER FRONT
- POSITION STORAGE
- PUSHER LENGTH
## Parameter List

<table>
<thead>
<tr>
<th>Turbo 3-26</th>
<th>3-36</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parameter</strong></td>
<td><strong>Values</strong></td>
</tr>
<tr>
<td>FIRST INSERT TRAVEL</td>
<td>1200</td>
</tr>
<tr>
<td>POSITION FRONT LIMIT</td>
<td>4400</td>
</tr>
<tr>
<td>POSITION REAR LIMIT</td>
<td>-20</td>
</tr>
<tr>
<td>POSITION MATERIAL DRAW-OFF</td>
<td>32</td>
</tr>
<tr>
<td>POSITION OPEN STEADY</td>
<td>3300</td>
</tr>
<tr>
<td>POSITION CLOSE STEADY</td>
<td>200</td>
</tr>
<tr>
<td>TRAVEL INTERVAL ON</td>
<td>1977</td>
</tr>
<tr>
<td>POS. REVERSE ROTATION RETURN</td>
<td>460</td>
</tr>
<tr>
<td>LIMIT POSITION SHORT PUSHER FRONT</td>
<td>1946</td>
</tr>
<tr>
<td>LIMIT POSITION STORAGE</td>
<td>2</td>
</tr>
<tr>
<td>PUSHER LENGTH</td>
<td>10</td>
</tr>
</tbody>
</table>

### Length Pusher Pos

- Length: 8, 12, 32, 4, 9, 6, 3, 2, 10
- Pusher Pos: 7, 11, 3, 5, 1, 4, 2, 10
5.7 Overview of positions for setting parameters

Variant A; D

1. POSITION FRONT LIMIT
2. POSITION STORAGE
3. LIMIT POSITION SHORT PUSHER FRONT
4. POSITION OPEN STEADY
5. POSITION CLOSE STEADY
6. POSITION REVERSE ROTATION RETURN
7. POSITION REAR LIMIT
8. TRAVEL INTERVAL ON
9. FIRST INSERT TRAVEL
10. PUSHER LENGTH
11. POSITION MATERIAL DRAW-OFF

Move to position with front edge of clamping sleeve.
Reference run to reference point.
Reference run to reference point

1. **POSITION REAR LIMIT**

2. **POSITION STORAGE**

3. **LIMIT POSITION SHORT PUSHER FRONT**

4. **POSITION OPEN STEADY**

5. **POSITION CLOSE STEADY**

6. **POSITION REVERSE ROTATION RETURN**

7. **POSITION FRONT LIMIT**

8. **TRAVEL INTERVAL ON**

9. **FIRST INSERT TRAVEL**

10. **PUSHER LENGTH**

11. **POSITION MATERIAL DRAW-OFF**
6. Control panel

The “On” status of the function keys (1) is shown by the LED on the function key and also by highlighting the function (1.1) with a black background. The switching status of the keys to the right of the display field (2) is shown by the black background only.

Attention! Depending on the countries the measure can be selected either in "mm" or "INCH".
6.1 Menu levels on the control panel

### Manual Menu 1

<table>
<thead>
<tr>
<th>Current Pos: 9.99999 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fault:</td>
</tr>
<tr>
<td>Remn:</td>
</tr>
</tbody>
</table>

**> Current Fault**

<table>
<thead>
<tr>
<th>Hand Wheel Travel: 9.999 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sepa:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Collet: Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oilp:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Auto-menu: Stdy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grip:</td>
</tr>
<tr>
<td>Part:</td>
</tr>
<tr>
<td>Push:</td>
</tr>
</tbody>
</table>

- **ROFF**
  - Draw remnant off and eject
  - Insert a new bar in the channel and draw it up.
  - Option: When selecting "SELECT BRON MODE: WITHOUT FIRST INSERT" in the menu "PART SELECT" the function BRON is switched off after pressing the new bar in.
  - When selecting "SELECT BRON MODE: WITH FIRST INSERT" the new bar is pushed to the cut-off position in the automatic lathe after pressing in. Thereafter the function BRON is switched off. Now the automatic mode can be selected and the loading magazine can be started in step 15. The "End of bar change, program start" signal (-K1) is given.

- **BRON**
  - Draw remnant off and eject it. Insert a new bar in the channel and draw it up.

- **BOFF**
  - Remove long bar

- **CHAN**
  - Guide channel open / close

- **PUSH**
  - Pusher swing out / in

- **AUTO-MENU**
  - Select Auto-Menu

- **STDY**
  - Steady on / off

- **GRIP**
  - Gripper blades close / open

- **PART**
  - Select menu "PART"

- **SERV**
  - Select menu "SERVICE"

- **REMN**
  - Remnant flap open / close

- **SEPA**
  - Separate material bar

- **OILP**
  - Oil pump on / off in manual operation

- Run forward with low speed and high speed.

- Run backward with low speed; and with high speed.

- Run forward – Run backward by hand wheel.

- The "HAND WHEEL TRAVEL" per detent can be set under Manual Menu 1.

- Press the Edit key to change the "HAND WHEEL TRAVEL: 0.5 mm" value by directly inputting a number or by using keys and . Press the key again to conclude the editing process and accept the value.

- Call up the page showing current errors.

- Select Manual-Menu 2
Manual Menu 2

<table>
<thead>
<tr>
<th>Standard:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MANUAL-MENU 2 MENU 1</strong> FMB</td>
</tr>
<tr>
<td>CURRENT POS: 9.999999 mm</td>
</tr>
<tr>
<td>FAULT</td>
</tr>
<tr>
<td>&gt; CURRENT FAULT</td>
</tr>
<tr>
<td>HAND WHEEL TRAVEL: 9.999 mm</td>
</tr>
<tr>
<td>COLLET: OPEN</td>
</tr>
<tr>
<td>CONV</td>
</tr>
</tbody>
</table>

with bundle loader (option)

| CONV |
| CONV |
| BUND↑ BUND↓ |

- **CONV** Move to conversion position
- **BUND↑** Belts wound up (option bundle loader)
- **BUND↓** Belts wound down (option bundle loader)
- **Run forward with low speed:** and **Run backward with low speed:** with high speed.
- **Run forward – Run backward by hand wheel**
  Run forward – Run backward by hand wheel
  The “HAND WHEEL TRAVEL” per detent can be set under Manual Menu 1.
  - Press the Edit key to change the “HAND WHEEL TRAVEL: 0.5 mm” value by directly inputting a number or by using keys and . Press the key again to conclude the editing process and accept the value.
- **Call up the page showing current errors.**
- **Select Manual-Menu 1**
Auto Menu

**Standard:**

<table>
<thead>
<tr>
<th>AUTO-MENU</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENT POS: FF:</td>
<td>999999</td>
</tr>
<tr>
<td>BAR LENGTH: FAULT</td>
<td>999999</td>
</tr>
<tr>
<td>S1</td>
<td></td>
</tr>
</tbody>
</table>

> CURRENT FAULT

| STEP 1 | S17 |
| RETURN |
| COLLET: OPEN | COUNTER: 9 |
| SST |
| REF | AUTO | INTV | INHE | W-OG |
| MANUAL | STDY | S-SE | BRAK | ST-L |

**with bundle loader (option)**

| REF | AUTO | INTV | INHE | W-OOG |
| MANUAL | STDY | BUND | BRAK | ST-L |

- **F1** REF: Start reference run (press key additionally)
- **F2** AUTO: Start / Stop automatic operation
- **F3** INTV: Interval insert on / off (for polygonal material)
- **F4** INHE: Steady as aid to insertion on / off
- **F5** W-OG: without gripper, disposal of remnant by auto lathe (press key additionally)
- **F7** MANUAL: Select Manual-Menu
  - **F8** STDY: Steady on / off
  - **F9** S-SE: Special separation (press key additionally)
  - **F9** BUND: Belts wound up (option bundle loader)
  - **F11** BRAK: Brake on / off (press key additionally)
  - **F11** ST-L: Lathe steady on / off
  - **F13** S.1: Select step 1 (return)
  - **F15** S.17: Select step 17 (parts production)
  - **ST** S.ST: Switch step-by-step
  - Run forward with low speed; and with high speed.
  - Run backward with low speed; and with high speed.

Run forward – Run backward by hand wheel
The "HAND WHEEL TRAVEL" per detent can be set under Manual Menu 1.

Press the Edit key to change the "FF" (FEED FORCE PART FOLLOW-UP) value by directly inputting a number or by using keys and . Press the key again to conclude the editing process and accept the value.
6.1.1 Switching between operating levels

a) Switch from Manual Menu 1 to Manual Menu 2 by pressing key ▼.

b) Switch from Manual Menu 2 to Manual Menu 1 by pressing key ▲.

c) Switch from Manual Menu 1 to Auto Menu by pressing the (AUTO MENU) key F7.

d) Switch from Auto Menu to Manual Menu 1 by pressing the (MANUAL MENU) key F7.

Pressing the Help key in MANUAL MENU 1, MANUAL MENU 2 and AUTO-MENU, calls up the appropriate Help page.

For example: MANUAL MENU 1:

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>ROFF Draw remnant off</td>
</tr>
<tr>
<td>F2</td>
<td>BRON Draw remnant off / load new bar</td>
</tr>
<tr>
<td>F3</td>
<td>BOFF Remove long bar</td>
</tr>
<tr>
<td>F4</td>
<td>CHAN Guide channel open / close</td>
</tr>
<tr>
<td>F5</td>
<td>PUSH Pusher swing out / in</td>
</tr>
<tr>
<td>F7</td>
<td>AUTO MENU Select Auto Menu</td>
</tr>
<tr>
<td>F8</td>
<td>STDY Steady on / off</td>
</tr>
<tr>
<td>F9</td>
<td>GRIP Gripper close / open</td>
</tr>
<tr>
<td>F10</td>
<td>PART Select PART menu</td>
</tr>
<tr>
<td>F11</td>
<td>SERV Select SERVICE menu</td>
</tr>
<tr>
<td>F13</td>
<td>REMN Remnant flap open / close</td>
</tr>
<tr>
<td>F14</td>
<td>SEPE Separation</td>
</tr>
<tr>
<td>F15</td>
<td>OILP Oil pump on / off by manual operation</td>
</tr>
</tbody>
</table>
6.2 Operating menu: PART and SERVICE

The parameters in the menu SERVICE should only be changed by qualified maintenance personnel or a FMB service technician.

Call up the menu with the appropriate key.

Editing the parameters in the "PART" and "SERVICE" menus is started with the key. Select the desired parameters with keys and , or move forward with key.

Numerical parameters are input using the number pad. Text parameters are selected using keys and . Editing is concluded with key.

If editing is switched off, further input fields in the "PART" and "SERVICE" menus can be reached with the key. The key switches back to the previous field.

The key is used to quit the "PART" and "SERVICE" menus.
6.2.1 Menu: PART

Switching to MENU: PART STANDARD SETTINGS
Switching to MENU: PART SPECIAL SETTINGS
Switching to MENU: PART SELECT
Switching to MENU: PART COUNTER
Switching to MENU: PART PROGRAM
Leave MENU: PART, back to MANUAL-MENU
Switching to MENU: PART LANGUAGE SELECT
6.2.1.1 Menu: PART STANDARD SETTINGS

Back to MENU: PART

Leave MENU: PART, back to MANUAL-MENU

6.2.1.2 Menu: PART SPECIAL SETTINGS

Back to MENU: PART

Leave MENU: PART, back to MANUAL-MENU
6.2.1.3 Menu: PART SELECT

Selection options:

- SELECT PART FOLLOW-UP: COL. OPEN FIXED SPEED
  PART LENGTH INTERNAL
  PART LENGTH EXTERNAL
  PART LENGTH INTERNAL + RETE
- SELECT W-OG:
  WITHOUT PRESS UPON
  WITH PRESS UPON
  WITH PRESS UPON + BAR CHANGE
- SELECT INTERVAL FEED:
  WITHOUT RETURN
  WITH RETURN
- SELECT LATHE STEADY:
  ROLLER STEADY
  JAW STEADY
  JAW STEADY CLOSED WHEN PUSHING
- SELECT FIRST INSERT:
  STANDARD
  TO STOP
- SELECT BRON MODE:
  WITHOUT FIRST INSERT
  WITH FIRST INSERT
- SELECT ENCODER -T4:
  OFF
  ON

with bundle loader (option)

Selection options with bundle loader:

- SELECT SEPARATION: WITH CHANNEL OPENED (STANDARD)
  WITH CHANNEL CLOSED (SPECIAL)
- SELECT BUNDLE LOADER:
  OFF
- LATERAL STORAGE:
  ON - 1 BAR
  ON – FULL LOADED

▲ Back to MENU: PART

F7 Leave MENU: PART, back to MANUAL-MENU
6.2.1.4 Menu: PART COUNTER

<table>
<thead>
<tr>
<th>MENU: PART COUNTER ▲</th>
<th>FMB</th>
</tr>
</thead>
<tbody>
<tr>
<td>PART COUNTER DESIRED</td>
<td>ACT</td>
</tr>
<tr>
<td>PART COUNTER CLEAR WITH CLR</td>
<td></td>
</tr>
</tbody>
</table>

CLOSE F7

▲ Back to MENU: PART

F7 Leave MENU: PART, back to MANUAL-MENU

6.2.1.5 Menu: PART LANGUAGE SELECT

<table>
<thead>
<tr>
<th>LANGUAGE SELECT</th>
<th>🇩🇪 🇬🇧 🇫🇷</th>
</tr>
</thead>
<tbody>
<tr>
<td>LANGUAGE:</td>
<td>☑ GERMANY_1/DEUTSCH_1</td>
</tr>
<tr>
<td>SELECT WITH [+] OR [-]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOFTWARE VERSIONS</th>
<th>🇩🇪 🇬🇧 🇫🇷</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLD:</td>
<td>&gt;</td>
</tr>
<tr>
<td>PLC:</td>
<td>&gt;</td>
</tr>
<tr>
<td>VCH:</td>
<td>&gt; &gt;</td>
</tr>
<tr>
<td>CLOSE F7</td>
<td>&gt; &gt;</td>
</tr>
</tbody>
</table>

- Display: Hardware Type
- Display: PLC Program
- Display: Program of control panel
- Display: Time the program was loaded (date/time)

In the "PART" menu, the F11 key activates a change of language.

- Enter activation code "222" in the input field.
- Confirm with the ▼ or ▲ key.
- Select the desired language with the ▼和▲ keys.
- Confirm with the ▼ or ▲ key.
- The "PART LANGUAGE SELECT" menu is quit; the new language is active.

If the language is not to be changed, the "PART LANGUAGE SELECT" menu is quit by pressing the F7 key.

The program can be selected as full version "1" (all possible selections) and light version "2" (sufficient for many applications).
6.2.1.6 Menu: PART PROGRAM

<table>
<thead>
<tr>
<th>PROGRAM LIST</th>
<th>P.ACTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td></td>
</tr>
</tbody>
</table>

CLOSE F7  OPEN F2  ACTIVE F9  F5<>F11

Cursor up
Cursor down
Open the selected program
Next program list
Previous program list
Activate selected program
Leave MENU: PART, back to MANUAL-MENU

Page 1

<table>
<thead>
<tr>
<th>PROGRAM READ</th>
<th>P</th>
<th>P.ACTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 1</td>
<td>&gt;</td>
<td></td>
</tr>
</tbody>
</table>

PART LENGTH: 100.0000 mm
FEED 1: 200.0000 mm
FEED 2: 200.0000 mm
FEED 3: 200.0000 mm
FEED FORCE FOR PART FOLLOW-UP: 500.0000 %
FEED FORCE F.PART FOLLOW-UP SUB-SPINDLE: 500.0000 %

CLOSE F7  EDIT F2  ACTIVE F9  >>>F5

Page 2

<table>
<thead>
<tr>
<th>PROGRAM READ</th>
<th>P</th>
<th>P.ACTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 1</td>
<td>&gt;</td>
<td></td>
</tr>
</tbody>
</table>

FEED FORCE FOR FIRST INSERT: 0.0000 %
FEED FORCE TO PRESS UPON: 0.0000 %
SPEED FOR PART FOLLOW-UP: 100.0000 m/min
SPEED FOR PART FOLLOW-UP SUB-SPINDLE: 100.0000 m/min
ACCELERATION PART FOLLOW-UP: 990.0000 m/min
SELECT PART FOLLOW-UP: COL. OPEN FIXED SPEED

CLOSE F7  EDIT F2  ACTIVE F9  >>>F5

Edit program
Page forward/back
Activate open program
Back to program list
Turbo Series 7

Page 1

<table>
<thead>
<tr>
<th>PROGRAM EDIT</th>
<th>P</th>
<th>P ACTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>P[X] &gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **PART LENGTH:** [value] mm
- **FEED 1:** [value] mm
- **FEED 2:** [value] mm
- **FEED 3:** [value] mm
- **FEED FORCE FOR PART FOLLOWUP:** [value] %
- **FEED FORCE FOR PART FOLLOWUP SUBSPINDLE:** [value] %

<table>
<thead>
<tr>
<th>CLOSE F7</th>
<th>READ F9</th>
<th>STORE F3</th>
<th>&gt;&gt;&gt;F5</th>
</tr>
</thead>
</table>

- **F3** Store program
- **F5** Page forward/back
- **F9** Read and change the active parameters
- **F7** Back to program list

Page 2

<table>
<thead>
<tr>
<th>PROGRAM EDIT</th>
<th>P</th>
<th>P ACTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>P[X] &gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **FEED FORCE FOR FIRST INSERT:** [value] %
- **FEED FORCE TO PRESS UPON:** [value] %
- **SPEED FOR PART FOLLOWUP:** [value] m/min
- **SPEED FOR PART FOLLOWUP SUBSPINDLE:** [value] m/min
- **ACCELERATION PART FOLLOWUP:** [value] m/min
- **SELECT PART FOLLOWUP:** COLOPERFIXED SPEED

<table>
<thead>
<tr>
<th>CLOSE F7</th>
<th>READ F9</th>
<th>STORE F3</th>
<th>&gt;&gt;&gt;F5</th>
</tr>
</thead>
</table>

6.2.1.6.1 Operating Menu: PART PROGRAM

Programs for up to 48 different parts can be edited and if required loaded in the loading magazine control system. This means that, once determined, parameters for a part can be saved and activated again as required. This function is integrated into the "PART" menu.

- Open the "PART" menu and call up the program list using key **F2" PROG"**.
- Select a program using the **↑** and **↓** keys.
- Open the selected program using the **F2" OPEN" key.
- Open the Edit mode using key **F2" EDIT"**.
- Specify the program names in the "PROGRAM EDIT" field. Letters can be entered using the **FUNCTION** key.
- The current parameters from the loading magazine control system are read into the program using the **F9" READ" key.
- Once editing is complete, save with the **F3" STORE" key.
- Switch back to the program list with the **F7" CLOSE" key.
- Activate the program in the control system with the **F9" ACTIVE" key.
6.2.2 Menu: SERVICE

CURRENT POSITIONS ▲

◄SPEED FEED FORCE►

POSITIONS ▼

CLOSE F7

▼ Switching to MENU: SERVICE POSITIONS
▼ Switching to MENU: SERVICE FEED FORCE
▲ Switching to MENU: SERVICE CURRENT POSITIONS
◄ Switching to MENU: SERVICE SPEED and SERVICE ACCELERATION
▼ Leave MENU: SERVICE, back to MANUAL-MENU

6.2.2.1 Menu: SERVICE POSITIONS

Page 1

MENU: SERVICE ▼▲ POSITIONS
FIRST INSERT TRAVEL: 10000.00 mm
POSITION FRONT LIMIT: 20000.00 mm
POSITION REAR LIMIT: 30000.00 mm
POSITION MATERIAL DRAWOFF: 30000.00 mm
POSITION OPEN STEADY: 40000.00 mm
POSITION CLOSE STEADY: 50000.00 mm

CLOSE F7

Page 2

MENU: SERVICE ▲ POSITIONS
TRAVEL INTERVAL ON: 40000.00 mm
POS. REVERSE ROTATION RETURN: 100000.00 mm
LIMIT POS. SHORT PUSHER FRONT: 120000.00 mm
POSITION STORAGE: 100000.00 mm
PUSHER LENGTH: 50000.00 mm
SELECT STEADY: ROLLER STEADY
Synchronizat. Clutch: WITHOUT SYNCHRO

CLOSE F7

Selection options:

SELECT STEADY: 
- ROLLER STEADY
- JAW STEADY
- ROLLER STEADY OPEN AT PUSHER
- JAW STEADY CLOSED WHEN PUSHING

SELECT SYNCHRONIZAT. CLUTCH: 
- WITHOUT SYNCHRO
- WITH SYNCHRO
- WITH SYNCHRO +S19

▼ Switching to MENU: SERVICE POSITIONS page 2, back with ▲
▼ Leave MENU: SERVICE, back to MANUAL-MENU
6.2.2.2 Menu: SERVICE FEED FORCE

<table>
<thead>
<tr>
<th>FEED FORCE FOR RETURN:</th>
<th>90000%</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEED FORCE FOR PART FOLLOWUP:</td>
<td>90000%</td>
</tr>
<tr>
<td>FEED FORCE FOR FIRST INSERT:</td>
<td>90000%</td>
</tr>
<tr>
<td>FORCE TO PRESS UPON:</td>
<td>90000%</td>
</tr>
</tbody>
</table>

CLOSE F7

▲ Switching to MENU: SERVICE

F7 Leave MENU: SERVICE, back to MANUAL-MANU

6.2.2.3 Menu: SERVICE SPEED / ACCELERATION

Page 1

<table>
<thead>
<tr>
<th>SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPEED FOR RETURN FROM SPINDLE:</td>
</tr>
<tr>
<td>SPEED FOR RETURN HIGH:</td>
</tr>
<tr>
<td>SPEED FOR PART FOLLOWUP:</td>
</tr>
<tr>
<td>SPEED FOR PART FOLLOWUP SUB-SPINDLE:</td>
</tr>
<tr>
<td>SPEED FOR FIRST INSERT:</td>
</tr>
<tr>
<td>SPEED FOR FIRST INSERT LOW:</td>
</tr>
</tbody>
</table>

CLOSE F7

▼ Switching to MENU: SERVICE ACCELERATION

▲ Switching to MENU: SERVICE SPEED

F7 Leave MENU: SERVICE, back to MANUAL-MANU
### 6.2.2.4 Menu: SERVICE CURRENT POSITIONS

<table>
<thead>
<tr>
<th>MENU: SERVICE ▲</th>
<th>CURRENT POSITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENT POSITION:</td>
<td>[mm]</td>
</tr>
<tr>
<td>POSITION INTERVAL ON:</td>
<td>[mm]</td>
</tr>
<tr>
<td>POSITION INTERVAL OFF:</td>
<td>[mm]</td>
</tr>
<tr>
<td>POSITION END FIRST INSERT:</td>
<td>[mm]</td>
</tr>
<tr>
<td>POS. BAR END 1: [mm]</td>
<td>BAR END 2: [mm]</td>
</tr>
<tr>
<td>BAR LENGTH:</td>
<td>[mm]</td>
</tr>
<tr>
<td>X31/X32:</td>
<td>[1-1-1-1-1-1-1-1]</td>
</tr>
<tr>
<td>X41:</td>
<td>[1-1-1-1-1-1]</td>
</tr>
</tbody>
</table>

**Switching to MENU: SERVICE**

**Leave MENU: SERVICE, back to MANUAL-MANU**
7. Assembly description

7.1 Support structure

The beam, supports and oil reservoir assemblies constitute the support structure. All parts of the loading magazine are mounted on the beam. The beam is bolted to the supports.

Each support can be adjusted in all directions with 4 M16 x 60 DIN 916 set screws each. The set screws must be located in the foot plates which are also supplied. After alignment, the supports are fastened to the floor with M 16 anchor bolts (see section 3).

The oil reservoir is positioned separately under the magazine. The oil forward and return flow hoses must be connected to the corresponding connections of the beam, and the oil pump must be electrically connected.
7.2 Roller steady and jaw steady

The steady can be convert to roller or jaw function as needed. What should be observed here is to convert the machining mode to the jaw function when profile material is to be used. When changing from jaw steady to roller steady, remove the guide jaws. Push the roller holder with the rollers to the stop of the jaw carrier and screw them down. The corresponding steady must be selected in the menu "SERVICE POSITIONS".

7.2.1 Setting the roller steady

Press the emergency stop key before opening the steady rest, the cover plate must assembled before operating the steady. There is a danger of bruising.

The roller steady guides the material bar directly behind the lathe spindle. When the pusher, which usually has a larger diameter than the material bar, enters, the steady rest opens. The movement of the steady rest is limited in open and closed positions by limit stops. Each limit position can be adjusted by handwheels which are secured by locknuts. The closed position must be set according to the diameter of the material bar to be processed. The rollers of the steady rest should be driven by the material bar, but not pressed firmly against the bar.

The open position of the steady rest is to be set so that the pusher can pass through but is still guided somewhat by the rollers. (see point 7.2.3)

For roller steady setting, we recommend the following procedure:

1. Open steady.
2. Move material bar with appropriate clamping sleeve into the auto lathe and clamp it.
3. Close steady.
4. Check if rollers can be moved freely.
5. When such move is given (rollers are not yet in touch with the material, previous material was bigger), turn stop screw 1 upward until it can be turned freely and rollers are in touch with the material (no longer movable).
6. Turn stop screw 1 downward until stop can be felt. As from this point on, the stop screw operates against the cylinder.
7. Open steady.
8. Thereafter, turn stop screw 1 downward by approx. 1 to 2 turns.
9. Check if rollers are resting with little play at the material bar, and if they can be moved freely again. The material bar should be guided with no pressure. This check needs to be done after any set-over, because pressing the rollers by the cylinder will result in bigger wear.
10. Stop screw 2 can be used to adjust the opening diameter of the steady:
   Turning upward = bigger opening diameter
   Turning downward = smaller opening diameter

7.2.2 Adjusting the jaw steadies

In closed position, the guide jaws are pressed together. Turn stop screw 1 completely upwards. The opened steady position is to be adjusted such that the pusher may pass through, but with a slight guide provided by the guide jaws. To this effect, the stop screw 2 is available (illustration).
Guide jaws oil supply
To prevent premature guide jaw wear, it is necessary to supply the guide jaws with oil. For oil supply, open the shut-off valve at the magazine. The quantity of oil is to be set so that the guide jaws does not wear, but that the oil does not run into the auto lathe.

Changing the guide jaws

Press the Emergency Stop key and close the compressed air valve on the loading magazine to depressurize the system before opening the covers.

The guide jaws of the steady rest must be matched to the diameter of the material. Selection must be made in such a way that the diameter of the jaws is not greater than the automatic spindle diameter, but 1 mm to 2 mm greater than the diameter of the material to be machined.

After removing the steady cover, the guide jaws can be replaced. Guide jaws are available in the following sizes:

<table>
<thead>
<tr>
<th>usable in turbo</th>
<th>Guide jaws</th>
<th>Ident-No.</th>
<th>Diameter of material to be machined</th>
</tr>
</thead>
<tbody>
<tr>
<td>26/36</td>
<td>D07</td>
<td>2021-764</td>
<td>3 - 6 mm</td>
</tr>
<tr>
<td>26/36</td>
<td>D10</td>
<td>2021-765</td>
<td>6 - 9 mm</td>
</tr>
<tr>
<td>26/36</td>
<td>D12</td>
<td>2053-000</td>
<td>9 - 11 mm</td>
</tr>
<tr>
<td>26/36</td>
<td>D13</td>
<td>2053-195</td>
<td>11 - 12 mm</td>
</tr>
<tr>
<td>26/36</td>
<td>D15</td>
<td>2021-766</td>
<td>12 - 14 mm</td>
</tr>
<tr>
<td>26/36</td>
<td>D16</td>
<td>2027-704</td>
<td>14 - 15 mm</td>
</tr>
<tr>
<td>26/36</td>
<td>D18</td>
<td>2044-040</td>
<td>15 - 17 mm</td>
</tr>
<tr>
<td>26/36</td>
<td>D20</td>
<td>2021-767</td>
<td>17 - 19 mm</td>
</tr>
<tr>
<td>26/36</td>
<td>D22</td>
<td>2027-705</td>
<td>19 - 21 mm</td>
</tr>
<tr>
<td>26/36</td>
<td>D25</td>
<td>2027-708</td>
<td>21 - 24 mm</td>
</tr>
<tr>
<td>26/36</td>
<td>D26</td>
<td>2053-196</td>
<td>24 - 25 mm</td>
</tr>
<tr>
<td>26/36</td>
<td>D28</td>
<td>2030-119</td>
<td>25 - 27 mm</td>
</tr>
<tr>
<td>36</td>
<td>D30</td>
<td>2021-769</td>
<td>27 - 29 mm</td>
</tr>
<tr>
<td>36</td>
<td>D32</td>
<td>2023-714</td>
<td>29 - 31 mm</td>
</tr>
<tr>
<td>36</td>
<td>D34</td>
<td>2024-758</td>
<td>31 - 33 mm</td>
</tr>
<tr>
<td>36</td>
<td>D35</td>
<td>2021-770</td>
<td>33 - 34 mm</td>
</tr>
<tr>
<td>36</td>
<td>D36</td>
<td>2024-970</td>
<td>34 - 35 mm</td>
</tr>
<tr>
<td>36</td>
<td>D37</td>
<td>2053-911</td>
<td>35 - 36 mm</td>
</tr>
<tr>
<td>36</td>
<td>D38</td>
<td>2060-512</td>
<td>36 - 37 mm</td>
</tr>
</tbody>
</table>
7.2.3 Illustration of roller steady and jaw steady

- Stop screw 1
- Limit stop close
- Stop screw 2
- Limit stop open

- Jaw carrier
- Clamping screw
- Roller holder
- Steady cover
7.3 Gripper - Function and mode of operation

For maintenance or repair work the gripper blades must be covered!
Their is danger of getting injured!

By means of the gripper it is possible to slide the swung-in material bar, before machining, into the clamping sleeve of the pusher and to remove the remnant therefrom. The gripper is actuated via a pneumatic cylinder. The closing motion is made through a guide plate and the bars are raised to the center of the spindle automatically.

For draw-up, the material bar, or, in case of draw-off, the remnant is transported into the gripping position between the gripper blades. Then the gripper is closed and the pusher’s clamping sleeve is slid, by means of the main drive, on to the material bar for draw-up and, for draw-off, pulled from the remnant.
7.4 Lateral material storage

The lateral material storage is used for storing the material bars and separating them for bar changes. The separating device consists of an ejector and a limit stop. For adjusting the desired material diameter, a material bar must be laid on. Turn the adjusting lever to set the limit stop to the diameter of the processing material bar and to lock it via a clamping lever. In order to prevent the material bars rolling on top of each other set the holding down device to 1.5 mm above the top of the bars. The holding down device is set via the clamping lever which must be locked again.
7.5 Drive

The pusher and, connected therewith, the material bar are drawn by a toothed belt. At the rear deflection, the drive motor with encoder is mounted, which informs the PLC about the pusher’s position.

7.5.1 Feed force drive

The feed force is infinitely adjustable at the control panel from 0.0% to 100%. By specifying the feed force the drive motor torque is limited accordingly.

The "FEED FORCE FOR PART FOLLOW-UP" can be edited on the control panel under the Auto Menu using the key and the number pad. The precise setting options can be seen in the Section "Menu levels on the control panel – Auto menu" (sect. 6.1).

If the "BRAKE ON" (BRAK) function is selected in the Auto Menu, the drive motor is activated with the value set in the "SERVICE FEED FORCE" menu under "FORCE BRAKE FUNCTION". The activation is active during parts production with the collet closed. The function keeps the pusher in position during parts production.
7.5.2 Motor and servo amplifier with control unit

7.5.2.1 Servomotor with absolut encoder
Brushless servomotor with Multturn absolut encoder.

7.5.2.2 Servo amplifier IndraDrive with control unit

**Attention !** Changes to the operator interface module may only be undertaken in line with instructions from the FMB staff!

The servo amplifier serves to trigger the brushless servo motor.
A MultiMediaCard with PLC program and drive parameters is inserted in the control unit. The operator interface module shows the current operating status and if any drive errors present.
7.5.3 Toothed belt drive

The toothed belt drive serves to move the pusher. The motor is mounted at the rear end. To ensure bar feed accuracy, care should be taken that the required tension is available at the toothed belt. To this effect, a tensioning device is mounted at the rear drive. The toothed belt must be tensioned such that any belt slippage is avoided. When the toothed belt is tensioned too much, the loading magazine will become stiff and wear increases.

![Diagram of toothed belt drive with labeled parts: clamping screws, tension screws, hand crank.]

7.5.4 Crank

Before the crank is fitted, the emergency stop key must be pressed and the compressed air valve at the loading magazine must be closed to depressurise the unit.

Attention !

Preferably, electrical manual feed should be used. The hand crank may only be used in exceptional cases and must be removed after use.

For maintenance and adjustment work, a crank can be fitted to the adapter connection of the toothed belt drive.
### 7.6 Refitting the magazine

**Attention!**

We would like to point out that for the operation of the FMB turbo 26 the maximum bar diameter to be processed must not be larger than 26 mm.

#### 7.6.1 Pusher

The pusher makes it possible to guide the end of the bar to behind the clamping jaw of the auto lathe. On its tip, it has a bearing insert on which the clamping sleeve with threaded bolts, to be changed depending on the material in question, is fitted. At the rear end, it is connected with the slide of the toothed belt drive via a coupling piece.

#### 7.6.2 Clamping sleeves / Centering sleeves / Clamping mandrels - Function and use

On the pusher, clamping sleeves (1), centering sleeves (2) or clamping mandrels (3) are required to guide the bar end.

The clamping sleeves, clamping mandrels and centering sleeves are attached to the rotatable bearing insert of the pusher by means of setscrews.

1. Pusher length with clamping sleeve
2. Pusher length with centering sleeve
3. Pusher length with clamping mandrel
7.6.2.1 Working with clamping sleeve

We exclusively recommend FMB clamping sleeves. The outer diameter of the clamping sleeve used must always match the diameter of the pusher.

The necessary truth of running of the clamping sleeves, measured by the material bar clamped, must be at least 0.1 mm. Possible speeds are decisively dependent on this.

In hexagonal or rectangular material, above all in the processing or brass and light-metal profiles, clamping sleeves with butted octagon or bi-hexagon are to be used.

If pipes with an internal diameter of more than 20 mm are processed, a ring in to be fitted in the clamping sleeve in increase the stop, in order to achieve the same first setting as with full material. The length of this ring is adapted in such a way that it has contact with the base of the clamping sleeve bore and forms a surface with the pinion. The ring is secured with a threaded bolt, which is inserted through the lateral bores of the clamping sleeve.

For the support of the material bars and the disposal of the residue in the loading magazine, the bar end must be turned down with a bar diameter > pusher diameter minus 4 mm. The diameter (H11) of the turn can be based on an existing clamping sleeve. The turn is to be at least 55 mm in length and have a truth of running of <0.1 mm.
Example of order:
Clamping sleeve SHT D 32 / 26.0

<table>
<thead>
<tr>
<th>clamping diameter</th>
<th>given in 1/10 mm (here: 26.0 mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>clamping sleeve outer diameter</td>
<td>(here: 32.0 mm)</td>
</tr>
<tr>
<td>= capacity adjustment set nominal diameter</td>
<td></td>
</tr>
</tbody>
</table>

**Attention!** In case of pusher diameter <25, clamping sleeve SHK is required!

Possible material diameters with outer diameters of clamping sleeves:

<table>
<thead>
<tr>
<th>outer diameter (mm)</th>
<th>15</th>
<th>25</th>
<th>32</th>
<th>36</th>
</tr>
</thead>
<tbody>
<tr>
<td>inner diameter (mm)</td>
<td>up to 12.0</td>
<td>up to 22.0</td>
<td>up to 28.0</td>
<td>up to 32.0</td>
</tr>
</tbody>
</table>

Other guide channels and clamping sleeve diameters available on request.
7.6.2.2 Working with centering sleeve

**Attention !** Centering sleeves cannot be used on movable spindle stock auto lathes.

**Attention !** As the material bar is not guided sufficiently when a centering sleeve is used, a reduction in speed must be expected.

**Attention !** When working with the centering sleeve, the remnant must be removed in forward direction (through the auto lathe)! Should material diameter considerably deviate from the guide channel diameter used, a reduction of the maximum possible speed can be reckoned with.

Centering sleeves are used when material bars with approximately the guide channel diameter are processed and no high demands are made of the necessary speed. The difference in diameters may not exceed 1 mm.
The bar end on the loading magazine side must have a central chamfer which fits into the centering sleeve. The chamfer is to be at least **10 mm x 45°** and have a **truth of running of <0.1**.
The remaining piece can be pulled out to the back. It is pushed into the auto lathe in a change of bars.

Control panel settings

- Switch on function "W-OG" (without gripper, the remnants are pushed forwards and removed) in Auto-menu (see section 6.1).
- Switch on function "BRAK" (brake) in Auto-menu (see section 6.1).
- Determine the extension of the pusher through the use of the centering sleeve according to the drawing (see section 7.6.2).
- Enter the new pusher length in the "SERVICE" menu under "POSITIONS" in the menu item "PUSHER LENGTH".
- Set the "SELECT PART FOLLOW-UP" in the menu "PART SPECIAL SETTINGS" to "COL OPEN-FIXED SPEED" (see section 6.2.1.2).
7.6.2.3 Working with clamping mandrel

**Attention!** Imbalance is to be taken into account when selecting the speed.

Clamping mandrels enable the guidance of pipe material on its inner diameter. The clamping mandrel used must have a **truth of running of <0.1 mm**. The pipe end is to be closed with a stopper so that the lubricant of the auto lathe and the oil in the loading magazine do not mix.

To avoid an imbalance due to coolant lubricants and chips, the use of a stopper on the pipe end in the auto lathe is also recommended. It is pushed into the tube in processing by the part length in question with a suitable tool of the auto lathe. Imbalance due to uneven walls is to be taken into account when selecting the speed.

![Diagram](image)

**Control panel settings**

- Determine pusher extension by using the clamping mandrel in accordance with the drawing shown on sect. 7.6.2.

- Enter new pusher length in the "SERVICE" menu under "POSITIONS" at menu item "PUSHER LENGTH".
7.6.3 Guide tube/Telescopic tube between loading magazine and auto lathe

7.6.3.1 Auto lathe with movable spindle stock

Before commissioning, the specified guide tube/telescopic tube shall be mounted between auto lathe spindle and loading magazine. During loading magazine operation, the guide tube/telescopic tube must be present.

Auto lathes with movable spindle stocks must not be operated without telescopic tubes or fixed spindle reductions projecting from the loading magazine into the spindle of the auto lathe.

Mount the telescopic tube in accordance with the drawing enclosed. By stating the respective order number, this drawing can be requested from FMB.

See section 5.1.5 ‘Spindle reduction’

The guide tube/telescopic tube bridges the distance between the front end of the loading magazine and the auto lathe’s spindle end. It serves as protective cover and prevents rotating parts from being ejected.

The inner diameter of the guide tube/telescopic tube depends on the pusher built-in.

Fixed spindle reduction:

Should mounting of a telescopic tube be impossible, the auto lathe can be operated with a fixed spindle reduction. For that purpose, the loading magazine guide tube contained in the capacity adjustment set is slid into the spindle. Thus, the maximum possible bar diameter is limited.

The following should be noted:

• The guide tube’s outer diameter must be 1 to 2 mm smaller than the spindle’s inner diameter.
• The length of the guide tube should be fixed such that it bridges the gap between loading magazine and spindle, whilst excluding any spindle destruction.
• The guide tube’s inner diameter must be 2 mm bigger than the diameter of the pusher built-in.
• The smallest wall thickness of the guide tube should be 2 mm at least.

Following steady (option):

In some auto lathes it is possible to attach a following steady. Such following steady improves the material bar’s vibration and guidance behaviour. It is mounted directly at the end of the spindle stock and guides the material bar during machining.

Since auto lathes are not always provided with the relevant mounting possibilities, prices and deliverability should be enquired.

Adjustments are to be made as described in subsection 7.2.
7.6.3.2 Auto lathe with fixed spindle stock

Before commissioning, the specified guide tube shall be mounted between auto lathe spindle and loading magazine. During loading magazine operation, the guide tube must be present.

The guide tube bridges the distance between the front end of the loading magazine and the auto lathe’s spindle end. It serves as protective cover and prevents rotating parts from being ejected.

The guide tube’s inner diameter depends on the pusher built-in. When installing the loading magazine, the length of the guide tube must be taken into account (see sect. 3). It should be fixed such that there is a gap of 5 mm at maximum between the end of the auto lathe spindle and the guide tube’s front end or such that the guide tube projects into the auto lathe spindle. This gap must not be within operator’s reach!
7.6.4 Selection and reconstruction, guide channel

To dampen the vibrations occurring in lathing, the guide channel comprises polyurethane inserts, which are held in aluminium profiles. This effect is supported by the oil filling and the pusher with rotating clamping sleeve, which is positioned on the end of the material bar.

Suggestions for standard equipment:

<table>
<thead>
<tr>
<th>usable in turbo</th>
<th>diameter, conversion kit</th>
<th>possible material diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>D36</td>
<td>&gt;22 mm to 32 mm</td>
</tr>
<tr>
<td>26/36</td>
<td>D25</td>
<td>&gt;13 mm to 22 mm</td>
</tr>
<tr>
<td>26/36</td>
<td>D15</td>
<td>&gt;5 mm to 12 mm</td>
</tr>
</tbody>
</table>

Due to the varying inner diameters of the spindles and cases of application, the table can only be used as an example. After your technical situation has become known, FMB will produce a corresponding suggestion for equipment.

The loading magazine is fitted and delivered with the guide channel diameter ordered. By using capacity adjustment sets, it can be converted to other passages as well.

To this effect, the following work steps are necessary:

- removal of the material from the guide channel
- polyurethane inserts replacement
- pusher replacement
- guide tube replacement / reduction in the telescopic tube
- setting the steady rest to the new pusher diameter (see section 7.2)

Capacity adjustment set order example:

3200 / 1466 / 32

- nominal guide channel passage (information on insert)
- pusher length L
- length of lateral material storage (max. bar length: 3200 mm)
7.6.5 Removing and fitting of the capacity adjustment set

Attention !

All inserts and individual parts of the capacity adjustment set must be refitted so that the correct functioning of the magazine is not impaired.

If there is no material or a remnant in the loading magazine, the magazine can be moved to the conversion position as follows:

2. Press "CONV".
3. The loading magazine move to the conversion position.
4. Press the Emergency Stop key and close compressed air shut-off valve at the loading magazine in order to ventilate the unit.
5. Open cover and secure guide channel with safety bolt.

The conversion works described under sections 7.6.5.1 to 7.6.5.4 can now be carried out!

If there is a long bar in the loading magazine it must be removed from the channel or from the clamping sleeve of the pusher. To do this, following steps are necessary:

2. Press "BOFF", LED of key lights (BOFF = remove long bar).
3. When the "BOFF" program is over, the LED in the key lights no longer.
4. Press "PUSH": Pusher will be swung out.
5. Press "CHAN": Guide channel will open.
6. Press the Emergency Stop key and close compressed air shut-off valve at the loading magazine in order to ventilate the unit.
7. Open cover and secure guide channel with safety bolt.
8. Draw material bar to the rear into the direction of the magazine’s end.
9. Should bars be on storage, empty storage.
10. Raise material bar via lateral storage out of the guide channel.

The conversion works described under sections 7.6.5.1 to 7.6.5.4 can now be carried out!
7.6.5.1 Replacement of the pusher

The unit must be depressurized and off circuit!

**Attention!**

After installing the pusher, it is essential to check the safe actuation of the switch -S1 in the rear limit position. In the rear limit position of the pusher the current position should be between 0.0 mm and -1.5 mm.

**Attention!**

To exclude problems when swinging in, the new pusher must be inserted so that the flag lies in the fixing device.

Each capacity adjustment set includes a special pusher with the appropriate lifting plates.

**How to replace the pusher:**

1. Put holding down device into his top position.
2. Take out spring bolt of the front lifting plate and remove the lifting plate.
3. Take out spring bolt of the rear lifting plate and remove the lifting plate, hold on to the pusher at the same time.
4. Remove pusher.
5. Replace top and bottom inserts.
6. Set in new front lifting plate with spring bolt.
7. Insert new pusher into the front lifting plate.
8. Raise rear area of the pusher and push the new rear lifting plate onto the pusher and the bolt, secure with spring bolt.
9. Remove safety bolt of the channel cover.
10. Check to ensure that all parts are properly fitted before swinging in.

The main points to check on are:
- seat of the inserts,
- carriage in rear limit position,
- the pusher’s lug must be within the guide.
7.6.5.2 Replacement of the polyurethane inserts

The unit must be depressurized and off circuit!

Attention!

An incorrect assembling of the inserts possibly results in a damage of the loading magazine!

How to replace polyurethane inserts:
1. Remove pusher.
2. Remove the inserts with the insert tool.
3. Release the stop bolt of the remnant flap, push the insert to the rear and remove it.
4. Now, all inserts can be removed from guide channel.
5. Fit the new inserts and secure them with the stop bolt.
6. Fit pusher.

7.6.5.3 Replacement of the guide tube

The unit must be depressurized and off circuit!

Attention!

Also see section 7.6.3.

How to replace the guide tube:
1. Loosen the clamping block.
2. Replace the guide tube and fix the clamping block again.
7.6.5.4 Replacement of the reduction inserts in the telescopic tube

The unit must be depressurized and off circuit!

Attention!

The possible reduction inserts are included in the telescopic tube delivery. When replacing, mind the drawing enclosed. This drawing can be requested from FMB by stating the corresponding order number.

Attention!

Also see section 7.6.3.

How to replace the reduction inserts in the telescopic tube:

1. Open clamping block.
2. Push telescopic tube together, and mount reduction according to the drawing enclosed in the delivery.
3. Mount the telescopic tube in reverse order.

If the conversion works described under sections 7.6.5.1 to 7.6.5.3 are completed:

1. Remove the safety bolt.
2. Close cover, unlock Emergency Stop key and open compressed air shut-off valve at the loading magazine in order to aerate the unit.
3. Press \( \text{CLR} \) in order to delete the "NO AIR PRESSURE -S11" fault message.
4. Press \( \text{F4} \) "CHAN": Guide channel will close.
5. Press \( \text{CLR} \) in order to delete the "GUIDE CHANNEL NOT CLOSED -Y1.1/S6" fault message.
6. Press \( \text{F5} \) "PUSH": Pusher will be swung in.
7. Set steady rest in accordance with section 7.2
8. After replacement of the pusher:
   Check the position of the lifting plates to ensure that the pusher can pass easily, adjust if necessary
7.6.5.5 Illustration: Conversion of the loading magazine
### Installation example: Capacity adjustment set D22/1466/2200-5300

(Other capacity adjustment sets available on request)

<table>
<thead>
<tr>
<th>Pos</th>
<th>Designation</th>
<th>2200 pc./pcs</th>
<th>3200 pc./pcs</th>
<th>3800 pc./pcs</th>
<th>4200 pc./pcs</th>
<th>5300 pc./pcs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pusher</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Lifting plate</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Short pusher</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Flag for pusher</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Guide bush</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Insert rear top 1400</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Insert rear bottom 1450</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Pusher length 1466</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Insert 460 remnant flap</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Insert front top 1160</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Insert front top 1000</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>Insert front top 600</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>Insert front bottom 600</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>Insert front bottom 500</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>Insert front top 500</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>Insert front bottom 765</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>Insert front bottom 1000</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>17</td>
<td>Guide jaw</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>Guide tube/telescopic tube</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
7.7 Shifting device (option)

When moving the shifting device of the loading magazine there is a risk of squeezing. An easy access to the loading magazine must be guaranteed. Ensure that no persons are in narrow zones.

Attention!

Working with the loading magazine is only allowed in its front, complete screwed basic position. The automatic lathe must not be switched on until the loading magazine has been screwed.

The shifting device makes it possible to move up the loading magazine 400 mm in opposite direction of the spindle axle of the automatic lathe. The shifting simplified the maintenance and conversion works.

The following work must be carried out to move the shifting device of the loading magazine:

1. Press Emergency Stop key.
2. The material storage and the guide channel must be empty. Ensure that there is no material bar between the loading magazine and the lathe.
3. Loosen and remove screws M10x25 of the shifting device.
4. Throw the levers to 90° and raise the magazine.
5. Secure the lever with safety bolt to prevent a self-acting lowering of the loading magazine.
6. Push the loading magazine 400 mm backwards.
7. Remove the safety bolt and lower the loading magazine.
8. Carry out the maintenance and conversion works.
9. Raise the loading magazine and secure it with safety bolts.
10. Push the loading magazine 400 mm forwards.
11. Remove safety bolts and lower the loading magazine in its front basic position.
12. Insert screws M10x25 into the shifting device and tighten them.
13. Release Emergency Stop key.

screw M10x25
7.8 Oil supply

Only top up with oil when the loading magazine is switched off and after a waiting time of 1 hour.

The quantity of inflowing oil can be regulated using the ball cock mounted on the submerged pump. Do not supply more oil than is absolutely necessary. In order to set the correct quantity of oil, the ball cock is turned approximately to the "Zero" position, and then opened until the motor runs smoothly.

The viscosity of the oil is also crucial for smooth running of the loading magazine (see Technical Data).

The area where the oil pump shall be switched on in the automatic mode, can be entered in "PART SPECIAL SETTINGS" menu under "POSITION OIL PUMP ON" and "POSITION OIL PUMP OFF". The "POSITION OIL PUMP ON/OFF" refers to the position of the pusher.
8. Functional description

8.1 Mode of operation

The magazine is loaded from the lateral storage through bar separation up to the guide channel.
When the pusher is swung out and the guide channel opened, the material bar falls into the guide channel, which will close then.
Now, the short pusher pushes the material bar forward until the bar end is within gripper’s reach. The short pusher moves back with the pusher being swung in. Then the gripper closes, the pusher moves forward and slides the clamping sleeve over the material bar’s end (for inner tensioning of tubes, clamping mandrels are used). The feed starts.

After reaching the cut-off position, the pusher stops and a signal is transmitted to the auto lathe.
Now, machining starts.

The oil filled guide channel and the steady rest placed in between auto lathe and guide channel ensure precise bar guidance, as it is required for machining.
The bearing inserts integrated into the pusher allow for working at high speeds. The guide tube/telescopic tube fastened at the front of the magazine, additionally acts as a spindle reduction.
The loading magazine works at auto lathe cycle. After manufacture of the last possible work piece, the auto lathe’s workflow is stopped with the collet being open.
For remnant removal, the pusher moves back. When the remnant is under the gripper blades, pusher will stop moving. The gripper blades close and the pusher moves into its rear limit position. The remnant is drawn off the clamping sleeve. If no remnant was supplied, a fault message will be released and the unit switched off. After having thrown the remnant from the remnant flap into the remnant bin, another remnant fall-out check is made via the gripper and the -S13 switch. If no error is reported, the pusher swings out and opens the guide channel to receive a new material bar. Now, the workflow starts anew.

Should, in case of automatic operation, a fault occur, the automatic workflow will be interrupted (LED in doesn’t light on control panel). This fault message is communicated to the auto lathe. The -K30 relay is released, whilst the error message is displayed on the control panel.

When the fault is removed and the error message acknowledged by pressing the key , the current switching step will be displayed again. Now, automatic workflow can be started again by pressing "AUTO".
8.1.1 Function of bundle loader (option)

The bundle loader is controlled by the PLC in the control cabinet. When the system is in automatic mode and the bundle loader has been selected in the part menu, the bundle loader is switched on.

If the lateral storage is not fully loaded, this is signaled by switches -S81 and -S82. The belts are wound up, the bundle of material is thus moved upwards and a bar is placed on the lateral storage. When the bar rolls off, switches -S81 and -S82 give a pulse for the belts to unwind. The bundle of material is moved upwards again as soon as switches -S81 and -S82 signal that a new bar can be transported.

When all bars have been transported from the bundle loader onto the lateral storage, the belts reach the upper limit stop. Switch -S55 is triggered. The drive motor stops, changes its direction of rotation and the belts are unwound. Switch -S56 stops the motor at the lower limit stop.

The bundle loader is loaded at the lower limit stop and is then switched to upwards transport by pressing \[ BUN↑ \].

When automatic mode is disabled, in Manual Menu 2 the belts can be wound up by pressing \[ BUN↑ \] and unwound by pressing \[ BUN↓ \].

8.1.1.1 Lateral storage loading variants with the bundle loader (option)

In menu "PART SELECT" under "SELECT BUNDLE" (see sect. 6.2.1.3) it is possible to select whether the lateral storage is to be loaded with one bar only or whether it is to be fully loaded.

Polygonal material setting: SELECT BUNDLE: 1 BAR
Round material setting: SELECT BUNDLE: FULL LOADED
8.2 Automatic workflow

Hereinafter, automatic operation with switched-on gripper function is depicted.

<table>
<thead>
<tr>
<th>Display information</th>
<th>Step function</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEP 1: RETURN</td>
<td>Return from auto lathe spindle at low speed. As of the value set at &quot;POS. REVERSE ROTATION RETURN&quot;, the motor, at high speed, returns to &quot;POSITION MATERIAL DRAW-OFF&quot;. When the position is reached, step 2 is switched into.</td>
</tr>
<tr>
<td>STEP 2: CLOSE GRIPPER BLADES</td>
<td>Gripper blades close and grip the remnant. The no longer actuated -S14 switch and a transfer time switch into step 3.</td>
</tr>
<tr>
<td>STEP 3: DRAW-OFF REMNANT</td>
<td>Gripper blades remain closed. Pusher moves back into &quot;POSITION REAR LIMIT&quot;. Switch -S1 and the reached &quot;POSITION REAR LIMIT&quot; switches to step 4.</td>
</tr>
<tr>
<td>STEP 5: OPEN REMNANT FLAP</td>
<td>Guide channel is open. Remnant flap swings out. Remnant falls into remnant bin. The no longer actuated switch -S17 and a transfer time switch into step 6.</td>
</tr>
<tr>
<td>without S.SE</td>
<td></td>
</tr>
<tr>
<td>with S.SE</td>
<td>*Option bundle loader: If there is a material bar on the lateral storage, switch -S80 recognizes it and the material separation moves down.</td>
</tr>
<tr>
<td>STEP 7: PUSHER SWINGS OUT</td>
<td>Guide channel is open. Pusher swings out. Material separation moves down.*</td>
</tr>
<tr>
<td>without S.SE</td>
<td>*Switches -S17 and -S22 switch into step 8.</td>
</tr>
<tr>
<td>*Option bundle loader: If there is a material bar on the lateral storage, switch -S80 recognizes it and the material separation moves down.</td>
<td></td>
</tr>
</tbody>
</table>
Guide channel is closed. The switching flap of the starting switch -S7 is swung down. Material separation moves up causing a new material bar to be raised from the lateral storage and to falls in front of the guide channel. Switches -S17, -S23 and a transfer time switch into step 8.

Guide channel is open. Pusher is swung out. Material separation moves up. The switching flap of the starting switch -S7 is swung down causing a new material bar to be raised from the lateral storage and to fall into the open guide channel. Switches -S5 and -S22 and a transfer time switch into step 9.

Guide channel opens. Pusher is swung out. Material bar falls into the guide channel. Switches -S5, -S22 and a transfer time switch into step 9.


Pusher remains swung out. Short pusher moves forward and pushes the bar end into the position that was entered under "LIMIT POSITION SHORT PUSHER FRONT" on the control panel. Then the short pusher moves back into the "POSITION REAR LIMIT". Switch -S1 and the reached "POSITION REAR LIMIT" switch into step 11.

Pusher swings into guide channel. Gripper blades close and grip the new material bar. Switch -S23, a transfer time and the non-actuated switch -S14 switch into step 12.

Gripper blades remain closed. Pusher moves forward into "POSITION MATERIAL DRAW-OFF". The reached position and switch -S23 switch into step 13:

Gripper blades open. Switch -S14 switches into step 14.
Display information

STEP 14
FIRST INSERT

Oil pump switches on and remains switched on until the "POSITION OIL PUMP OFF" has been reached. Pusher slides material bar into auto lathe spindle until bar's front is in cut-off position. This position is computed out of the value entered under "FIRST INSERT TRAVEL". When the "INTV" "INTERVAL FEED" function is selected, the motor slides the set travel with the set cycle time forward. Upon reaching the cut-off position step 15 is switched into.

OPTION:
When "SELECT FIRST INSERT: STANDARD" is selected in menu "PART SELECT", and upon reaching the cut-off position step 15 is switched into.
When "SELECT FIRST INSERT: TO STOP" is selected in menu "PART SELECT", and upon reaching the cut-off position the material bar will be pushed forwards onto the stop. The reaching of the cut-off position and the evaluation "Pusher stand" switch to step 15.

STEP 15:
START LATHE

Via the -K1 relay, the message "BAR CHANGE END - PROGRAM START" is communicated to the auto lathe. Upon auto lathe collet closing, the contact "collet open" releases and switches into step 16.

STEP 16:
MATERIAL CUT OFF

The bar’s front is cut-off. After cut-off, step 17 is switched into via the "collet open" contact.

STEP 17:
PART PRODUCTION

The material bar is machined. Current bar length is shown in the display. When the message "collet open" is applying from the auto lathe, the motor slides the material bar forward. If, during parts follow-up, the value computed in the PLC for the bar end ("POSITION FRONT LIMIT" less "PART LENGTH") is exceeded, step 18 will be switched into.

STEP 18:
INSERT LAST PART

The last material is fed into the auto lathe. Via the releasing contact "collet open", step 19 is switched into.

STEP 19:
MACHINE LAST PART

The last workpiece is machined. Through the -K9 relay, the message "BAR END – PROGRAM STOP" is communicated to the auto lathe. When the last part is machined completely, the auto lathe uses contact "End of program cycle" to switch into step.

STEP 20:
STOP LATHE / START BAR CHANGE

Relay -K9 is switched on. A transfer time switches into step 1.
9. Faults/Error messages

9.1 Faults display

Current faults are displayed in the Manual Menu and the Auto Menu.

- Display of the current faults
- Cancelling the faults
- Call up the position of the fault on the loading magazine

`Current faults` display:

<table>
<thead>
<tr>
<th>MACHINE FAULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>99 99 99</td>
</tr>
<tr>
<td>99 99 99</td>
</tr>
<tr>
<td>99 99 99</td>
</tr>
<tr>
<td>99 99 99</td>
</tr>
</tbody>
</table>

`Position of the fault on the loading magazine` display:

<table>
<thead>
<tr>
<th>MACHINE FAULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>99 99 99</td>
</tr>
<tr>
<td>99 99 99</td>
</tr>
<tr>
<td>99 99 99</td>
</tr>
<tr>
<td>99 99 99</td>
</tr>
</tbody>
</table>

- Call up an error record of the last 48 error messages (error messages including those already cancelled are displayed).

- By repeatedly pressing the `F5` key it is possible to switch between the pages.

- Call up a detailed error record, which displays the axle faults with the relevant error code.

`Error record` display:

<table>
<thead>
<tr>
<th>FAULTS PROTOCOL 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>99 99 99</td>
</tr>
<tr>
<td>99 99 99</td>
</tr>
<tr>
<td>99 99 99</td>
</tr>
<tr>
<td>99 99 99</td>
</tr>
</tbody>
</table>

`Axle fault error record` display:

<table>
<thead>
<tr>
<th>FAULTS PROTOCOL 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>99 99 99</td>
</tr>
<tr>
<td>99 99 99</td>
</tr>
<tr>
<td>99 99 99</td>
</tr>
<tr>
<td>99 99 99</td>
</tr>
</tbody>
</table>
9.2 Error messages

DISPLAY INFORMATION
Cause of trouble, remedy

FAULT:
EMERGENCY STOP LOADING MAGAZINE -S69
Emergency stop key on the control panel of the loading magazine is pressed.

FAULT:
EMERGENCY STOP LATHE
Emergency stop key on the automatic lathe is pressed.

FAULT:
NO AIR PRESSURE -S11 CHECK AIR PRESSURE MIN. 5 BAR
Pressure switch -S11, check whether compressed air shut-off valve is open.

FAULT:
MOTOR PROTECTION -Q1 TRIPPED! -M1/Q1 CHECK -M1, SWITCH -Q1 ON
Switch motor protection switch -Q1 on again.

FAULT:
MOTOR PROTECTION -Q2 TRIPPED! -M2/Q2 CHECK -M2, SWITCH -Q2 ON
Switch motor protection switch -Q2 on again.

FAULT:
GUIDE CHANNEL NOT CLOSED -Y1.1/S6 CHECK GUIDE CHANNEL
Solenoid valve -Y1.1 must be switched on.

FAULT:
OPENING – CLOSING OF GUIDE CHANNEL NOT CORRECT -Y1/Y1.1/S5/S6
When the guide channel is open, switch -S5 must be actuated. In case of closed guide channel, switch -S6 must be actuated.

FAULT:
PRESS UPON NOT CORRECT, POS. MATERIAL DRAW-OFF NOT REACHED
When the clamping sleeve was pressed upon the new material bar, the "POSITION MATERIAL DRAW-OFF" has not been reached.

FAULT:
NO RETURN OF REMNANT-S13
During enquiry in steps 3 and 4, switch -S13 was actuated.

FAULT:
NO NEW BAR IN GUIDE CHANNEL -S13
During material insertion in steps 11 and 12, switch -S13 was actuated.

FAULT:
MONITORING TIME BAR CHANGE EXPIRED; FAULT AT BAR CHANGE
The bar change in step 20 as well as in steps 1 to 15 did not run correctly.
FAULT: MONITORING TIME MOTOR EXPIRED; FAULT AT BAR CHANGE
A motor program was running too long, e.g. when from the auto lathe the contact "collet open" is applying for more than 5 minutes.

FAULT: PART FOLLOW-UP TOO SHORT
Active only, if in the "PART SPECIAL SETTINGS" menu a value >0 is entered at: "MIN. PART LENGTH FOLLOW-UP". When the entered value is not reached during "PART FOLLOW-UP", a fault message will be released.

FAULT: PART FOLLOW-UP TOO LONG
Active only, if in the "PART SPECIAL SETTINGS" menu a value >0 is entered at: "MAX. PART LENGTH FOLLOW-UP". When the entered value is exceeded during "PART FOLLOW-UP", a fault message will be released.

FAULT: SERVO CONTROLLER / MOTOR -M1/N1
Servo controller / motor release a fault message.

FAULT: SERVOMOTOR OVERLOADED -M1/N1
Servo controller/motor has been overloaded for some time.

FAULT: REMNANT JAMMED IN CLAMPING SLEEVE -S13
During remnant fall-out check in step 6, switch -S13 was not actuated.

FAULT: AXIS CONTROLLER ERROR; DETAILS F3:
The servo amplifier releases a fault message.

FAULT: COVER NOT CLOSED -S74/S75/S76/K20/K21
Covers not closed. Switch -S74 or -S75 is not actuated, or the loading magazine is not in home position, switch -S76 is not actuated.

FAULT: STARTING SWITCH -S7 NOT IN HOME POSITION -ZY9/S7
Actuation flap for switch -S7 is not in its initial position or switch -S7 is not actuated.

FAULT: REMNANT FLAP NOT CLOSED -Y10.1/S17
Solenoid valve -Y10.1 is not switched on or switch -S17 was not actuated.
**FAULT:**
**PUSHER NOT SWUNG IN CORRECTLY**  -Y8.1/S23

Pusher not swung in correctly. Solenoid valve -Y8.1 is not switched on, or switch -S23 has not been actuated.

**FAULT:**
**NEG.SOFTWARE ENDPOSITION WAS OVERRUN; RELEASE WITH MANUEL FUNCTION FORWARD**

Negative software end position was overrun. Release with key.

**FAULT:**
**POS.SOFTWARE ENDPOSITION WAS OVERRUN; RELEASE WITH MANUEL FUNCTION BACKWARD**

Positive software end position was overrun. Release with key.

**FAULT:**
**PUSHER OUT OF POSITION**

The pusher was pushed backwards or forwards when there was no pushing signal.
Check whether "BRAK" function in Automatic menu is switched on. The supervision is only effective when "PART LENGTH INTERN" or "PART LENGTH EXTERN" is selected.

**FAULT:**
**ENCODER NOT OK OR PUSHER IS BLOCKING**  -T3

The pusher (material bar) was blocked.
Possible causes:
- feed force set too low
- automatic lathe collet opens too late
- material jammed in collet
- encoder defective (-T3)

**FAULT:**
**PUSHING SIGNAL NOT OK CHECK SIGNAL FROM LATHE**

The signal "Collet open" is checked internally. If this signal appears several times within a short time, the error is announced (signal flatters). The supervision is only effective when "PART LENGTH INTERN" or "PART LENGTH EXTERN" is selected".

**OPTION:**

**FAULT:**
**MAGAZINE NOT IN START POSITION. START POSITION STEP 1,15,17 OR 19**

The loading magazine only can be started in step 1, 15, 17 or 19.

**FAULT:**
**BAR WAS RETRACTED**

Active only, if in the "PART SPECIAL SETTINGS" menu a value >0 is entered at: "MAX. BAR RETURN". With "Collet open", if the pusher is retracted above this value, the error message is triggered.

**FAULT:**
**CHANGE OVER MOTOR DIRECTION**

The drive motor direction switching is not functioning properly.
FAULT: NO REFERENCE! START REFERENCE RUN
Start reference run with the ▲ and ▼ keys in the Auto Menu.

FAULT: NO STOP IN THE LATHE
If "SELECT FIRST INSERT: TO STOP" is selected, the material bar is pushed still forwards after moving the first insert travel.
If thereby the material bar is not stopped via a bar stop, this error message is given.

FAULT: COLLET IN THE LATHE CLOSED
If "SELECT BRON MODE: WITH FIRST INSERT" is selected the material bar having been pressed upon is pushed forwards only when the lathe collet is opened. If the lathe collet is closed, this error message is given.

Operation with bundle loader (option):

FAULT: MOTOR PROTECTION -Q3 TRIPPED! -M3/Q3 CHECK -M3, SWITCH -Q3 ON
Check Motor -M3.
Switch motor protection switch -Q3 on again.

FAULT: BUNDLE BELTS WOUND UP / CHECK BUNDLE BELTS AND SWITCH -S55
Permitted time exceeded winding up bundle loader belts.
Control bundle loader. Check limit switch -S55.

FAULT: BUNDLE BELTS WOUND OFF / CHECK BUNDLE BELTS AND SWITCH -S56
Permitted time exceeded unwinding bundle loader belts.
Control bundle loader. Check limit switch -S56.

FAULT: LATERAL STORAGE EMPTY -S80
Lateral storage empty, no material.

FAULT: COVER NOT CLOSED -S72/S73/S74/S75/S76/K20/K21
When starting the automatic operation or the manual operation of the bundle loader, the doors of the bundle loader are not closed.

FAULT: BUNDLE LOADER OVERLOADED -M3/B1
Bundle loader has been overloaded. Check bundle loader.
10. Removing a material bar from guide channel

For removing a long material bar from the guide channel, the following operations are necessary:

2. Press "BOFF", LED of key F3 lights (BOFF = remove long bar).
3. When the "BOFF" program is over, the LED in the key F3 is no longer illuminated.
4. Press the Emergency Stop key and close compressed air shut-off valve at the loading magazine in order to ventilate the unit.
5. Open cover.
6. Push material bar into the direction of the auto lathe in order to enable gripper blade closing without material.
7. Close cover, unlock Emergency Stop key and open compressed air shut-off valve at the loading magazine in order to aerate the unit.
8. Press CLR in order to delete the "NO AIR PRESSURE -S11" fault message.
9. Press "PUSH": Pusher will be swung out.
10. Press "CHAN": Guide channel will open.
11. Press the Emergency Stop key and close compressed air shut-off valve at the loading magazine in order to ventilate the unit.
12. Open cover and secure guide channel with safety bolt.
13. Draw material bar to the rear into the direction of the magazine’s end.
14. Should bars be on storage, empty storage.
15. Raise material bar via lateral storage out of the guide channel.
16. Convert magazine, if necessary, and re-load material bars as requested.
17. Remove the safety bolt.
18. Close cover, unlock Emergency Stop key and open compressed air shut-off valve at the loading magazine in order to aerate the unit.
19. Press CLR in order to delete the "NO AIR PRESSURE -S11" fault message.
20. Press "CHAN". The guide channel closes.
21. Press CLR in order to delete the "GUIDE CHANNEL NOT CLOSED -Y1.1/S6" fault message.
22. Press "PUSH". The pusher is swung in again.
11. Maintenance works and settings

11.1 Maintenance to be carried out regularly

**Attention !**

As a function of the strain on the loading magazine by vibrations, it may be possible that the maintenance intervals stated are shortened.

- Every month, the screw connections at the gripper, steady and channel of the loading magazine are to be checked and tightened if necessary.
- Every half year, all the screw connections are to be tightened.
- Every year, the alignment of the loading magazine to the auto lathe spindle is to be checked and readjusted if necessary.
- Every year, the alignment of the steady rest and guide tube is to be checked and readjusted if necessary.
- If the maintenance intervals stated are not complied with, the output of the loading magazine can be limited.
- The loading magazine may not be operated if screw connections are loose.
11.2 Maintenance unit

Id.Nr.: 2058-273

Consisting of:

1. Starting valve
2. Filter-regulator valve
3. Plug-in screwing
4. Pressure switch
5. Connecting plate
6. Plug-in screwing
7. Double nipple
8. Manometer
9. Condensate glass

The filter-regulator valve (2) is factory-set to a working pressure of 0.6 MPA (6 bar). To regulate or reset it, the adjusting knob (2.1) is released (E) and turned to the right with inlet pressure on until the pressure gauge shows the required outlet pressure. The pressure setting is kept constant by locking (V) the adjusting knob (2.1).

Condensate drainage: Manual condensate drainage with the drain screw (9.1) is only possible under pressure.
11.3 Fitting or removing an I/O module

The mains power supply must always be switched off when a module is fitted or removed. If this rule is not followed, the PLC may switch to STOP, the module may be damaged or persons may even be injured.

Your attention is drawn to the following recommendations for fitting or removing I/O modules. Connection to process wiring is effected by means of removable terminal strips supplied with every I/O module. This makes it easy to wire the process terminals in advance or to change modules.

11.3.1 Removing the terminal strip block

- Release terminal block and remove (see fig.).
- Remove all terminal blocks

11.3.2 Fitting the terminal strip block

- Hook terminal block on the module and click into place (see fig.).
11.3.3 Removing the terminal strip

- Using a screwdriver, press the red release lever down
- Raise the module and unhook it

11.3.4 Fitting a module

- Hook the module in place at the top and click it into place at the bottom.
12. Electrical and pneumatic equipment

-S1 Pusher, rear limit position/swing out position
-S5 Guide channel opened
-S6 Guide channel closed
-S7 First insert start
-S11 Pressure switch
-S13 Gripper blades closed
-S14 Gripper blades opened
-S17 Remnant flap swung in
-S22 Pusher swung out
-S23 Pusher swung in, within guide channel
-S55 Belts wounded up (option)
-S56 Belts wounded down (option)
-S69 Emergency stop key
-S72 Cover bundle loader (option)
-S73 Cover bundle loader (option)
-S74 Cover closed, rear
-S75 Cover closed, front
-S76 Shifting device in basic position (option)
-S77 Bundle loader in basic position (option)
-S80 Material on lateral storage, front (option)
-S81 Material on lateral storage (option)
-S82 Material on lateral storage (option)

-Q1 Motor protection switch for M1 (drive motor)
-Q2 Motor protection switch for M2 (oil pump)
-Q3 Motor protection switch for M3 (drive motor bundle loader) (option)
-M1 Drive motor
-M2 Oil pump
-M3 Drive motor with break bundle loader (option)
-T3 Multiturn encoder
-T4 Encoder (option)
-KY6 Synchronization clutch (option)
Solenoid valves

-Y1  open guide channel
-Y1.1 close guide channel
-Y2  close gripper blade
-Y5  separate material
-Y7  close steady rest
-Y8  swing pusher out
-Y8.1 swing pusher in
-Y10 swing remnant flap out
-Y10.1 swing remnant flap in

Pneumatic cylinders

-ZY1  open/close guide channel
-ZY2  open/close gripper blade
-ZY5  separate material
-ZY7  open/close steady rest
-ZY8  swing out/in pusher
-ZY9  reset switching flap of the starting switch
-ZY10 swing out/in remnant flap
12.1 Arrangement of electrical and pneumatic equipment
12.2 Arrangement of electrical and pneumatic equipment with bundle loader (option)
### 13. Parts list of pneumatic parts

<table>
<thead>
<tr>
<th>Item</th>
<th>Qty</th>
<th>Designation/Type</th>
<th>Id-No</th>
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<tr>
<td>1</td>
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<td>Cylinder ADN-32-70-A-P-A (length 2200)</td>
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<tr>
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<td>3</td>
<td>(length 3200, 3800)</td>
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<td>(length 4200, 4775)</td>
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<td>(length 5300)</td>
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<td>(length 3200, 3800, 4200, 4775, 5300)</td>
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<td>Solenoid valve 5/3</td>
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<td>One-way restrictor GRLZ-1/8-QS6D</td>
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<td>Plug-in screwing QSMLL-1/8-6</td>
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<td>Plug-in screwing QSTF-1/8-6-B</td>
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<td>On/Off valve HE-D-MINI</td>
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<td>Condensate glass</td>
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<td>1</td>
<td>Manometer</td>
<td>2058-328</td>
</tr>
</tbody>
</table>
13.1 Pneumatic diagram - page 1

- Zy1
  Guide channel
  open: close

- Zy8
  Pusher
  swing in: swing out

- Zy10
  Remnant flap
  open: close

- Zy2
  Gripper
  open: close

Ø50/16x50 stroke
Ø32/12x70 stroke (2200)
Ø32/12x70 stroke (3200/3800)
Ø32/12x70 stroke (4200/4775)
Ø32/12x70 stroke (53000)
Ø32/12x70 stroke (6200)

(400mm)
(600/800mm)
(2200)
(3200/3800)
(4200/4775)
(53000)
(6200)
-ZY5
Separation
down up

-ZY9
Starting switch
reset switching flap
of the starting switch
Ø12/6x25 stroke

-ZY7
Steady rest
open close
Ø32/12x30 stroke

2x Ø32/12x30 stroke (2200)
3x Ø32/12x30 stroke (3200/3800/4200/4775)
4x Ø32/12x30 stroke (6200)