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Originalfassung

DE BETRIEBSANLEITUNG **METALLDREHMASCHINE**

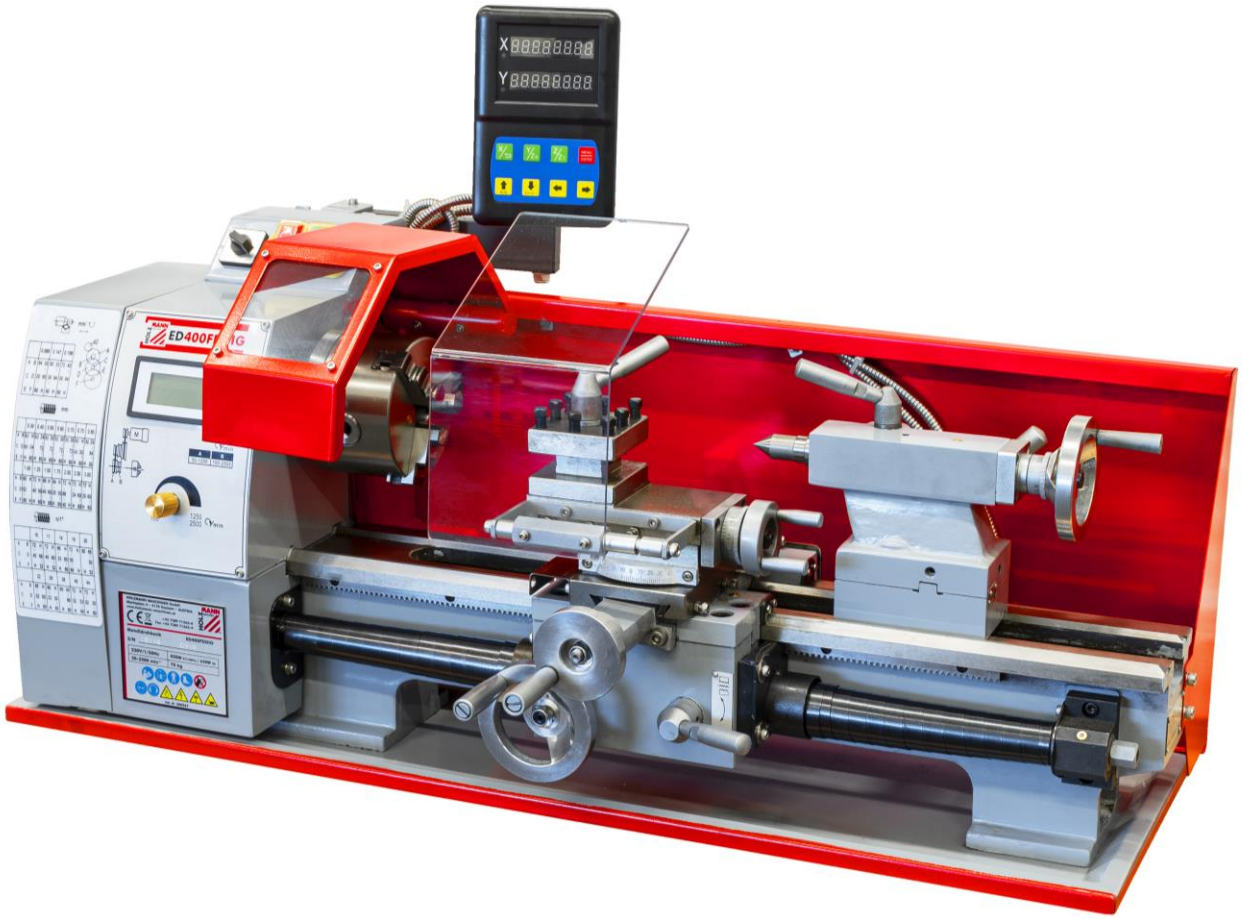
Übersetzung / Translation

EN USER MANUAL **METAL TURNING LATHE**

ES MANUAL DE INSTRUCCIONES **TORNO PARA METAL**

FR MANUEL D'UTILISATION **TOUR À MÉTAL**

IT ISTRUZIONI PER L'USO **TORNIO PER METALLO**



ED400FD ED400FDDIG

Edition: 15/07/2019 – Revision - 00 – RaR - DE/EN/ES/FR/IT

2 SICHERHEITSZEICHEN / SAFETY SIGNS / AVISOS DE SEGURIDAD / SYMBOLES DE SÉCURITÉ / SEGNALI DI SICUREZZA

DE	SICHERHEITSZEICHEN BEDEUTUNG DER SYMBOLE	**EN**	SAFETY SIGNS DEFINITION OF SYMBOLS	**ES**	SEÑALES DE SEGURIDAD SIGNIFICADO DE LOS SÍMBOLOS
FR	SYMBOLES DE SÉCURITÉ SIGNIFICATION DES SYMBOLES	**IT**	SEGNALI DI SICUREZZA SIGNIFICATO DEI SIMBOLI		

DE **CE-KONFORM!** - Dieses Produkt entspricht den EG-Richtlinien.

EN **CE-Conformal!** - This product complies with the EC-directives.

ES **¡CONFORMIDAD CE!** - Este producto cumple con las directivas CE.

FR **CONFORMITÉ CE** - Ce produit répond aux directives CE.

IT **CONFORMITÀ CE!** - Questo prodotto è conforme alle direttive CE.

DE Anleitung beachten!

EN Follow the instructions!

ES ¡Observe el manual de instrucciones!

FR Respecter le manuel !

IT Osservare le istruzioni!

DE Handschuh-Trageverbot bei Arbeiten an rotierenden Teilen!

EN Never wear gloves when working on rotating parts!

ES ¡No use guantes cuando trabaje en componentes rotatorios!

FR Défense de porter des gants lors des interventions sur les pièces rotatives !

IT Non indossare guanti quando si lavora su parti rotanti!

DE Maschine vor Reparatur, Wartung oder Pausen ausschalten und Netzstecker ziehen

EN Switch off the machine before repairing, servicing or stopping work and pull out the mains plug

ES Pare la máquina y desconéctela de la red eléctrica antes de llevar a cabo trabajos de reparación o de mantenimiento o antes de las pausas

FR Avant toute réparation, maintenance, ou pause, éteindre la machine et débrancher la prise

IT Spegnere la macchina prima della riparazione, manutenzione o delle pause e scollegare la spina di rete

DE Persönliche Schutzausrüstung tragen!

EN Wear personal protective equipment!

ES ¡Use el equipo de protección individual!

FR Porter un équipement de protection individuelle !

IT Indossare i dispositivi di protezione individuale!

DE Gefährliche elektrische Spannung

EN Dangerous electrical voltage

ES Tensiones eléctricas peligrosas

FR Tension électrique dangereuse !

IT Tensione elettrica pericolosa!

DE Warnung vor rotierenden Teilen

EN Warning of rotating parts

ES Advertencia de componentes rotatorios

FR Avertissement de pièces rotatives !

IT Attenzione alle parti rotanti!

DE Warnung vor Handverletzungen

EN Warning of hand injuries

ES Advertencia de sufrir lesiones en las manos

FR Avertissement contre les blessures aux mains

IT Avviso di lesioni alle mani

DE Warnung vor spitzem (scharfem) Werkzeug

EN Warning of pointed (sharp) tool

ES Advertencia de herramientas puntiagudas (afiladas)

FR Avertissement contre les outils pointus (tranchants)

IT Attenzione agli utensili appuntiti (affilati)

DE Warnschilder und/oder Aufkleber an der Maschine, die unleserlich sind oder die entfernt wurden, sind umgehend zu erneuern!

EN Missing or non-readable safety stickers have to be replaced immediately!

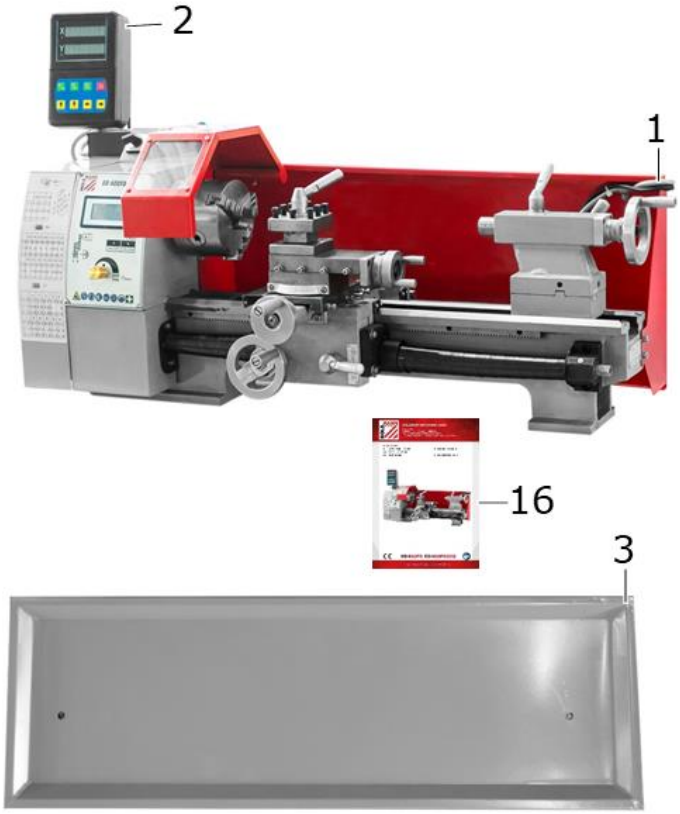
ES ¡Deben sustituirse inmediatamente los letreros de advertencia y/o las pegatinas que haya en la máquina, que se hayan vuelto ilegibles o se hayan despegado!

FR Les panneaux d'avertissement et/ou autocollants d'avertissement illisibles ou retirés sur la machine doivent être remplacés immédiatement !

IT I segnali di avvertimento e/o le etichette applicate sulla macchina, che sono illeggibili o sono stati rimossi, devono essere sostituiti immediatamente!

3 TECHNIK / TECHNIC / TÉCNICA / TECHNIQUE / TECNOLOGIA

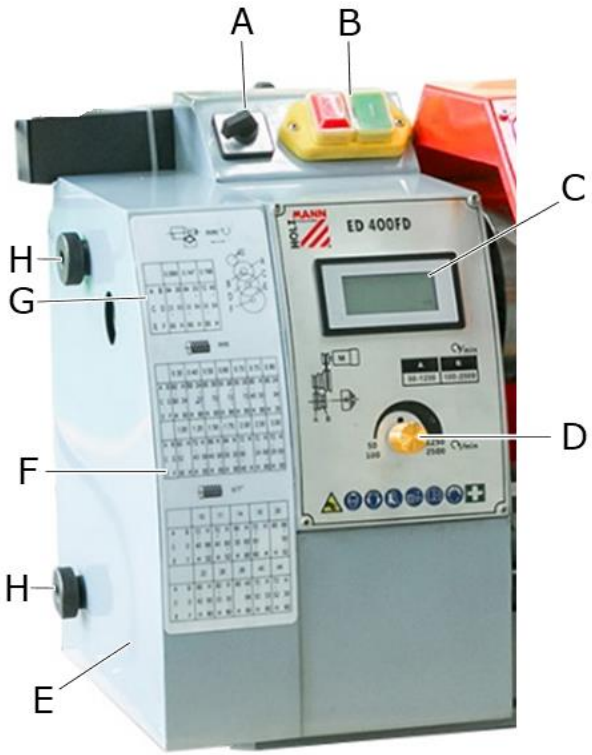
3.1 Lieferumfang / Delivery Content / Equipamiento suministrado / Contenu de la livraison / Dotazione di fornitura



ED400FD | ED400FDDIG			
1	Metalldrehmaschine / metal turning lathe / Torno para metal / Tour à métal / Tornio per metallo	**9**	Reserve-Sicherungen / spare fuses / Fusibles de reserva / Fusibles de rechange / Fusibili di riserva
2	Digitale Positionsanzeige (nur bei Modell ED400FDDIG) / digital read out unit (only for model ED400FDDIG) / Indicador de posición digital (sólo en el modelo ED400FDDIG) / Affichage numérique de la position (uniquement pour le modèle ED400FDDIG) / Indicatore di posizione digitale (solo modello ED400FDDIG)	**10**	Hakenschlüssel / hook spanner / Llave de gancho / Clé à ergot / Chiave a settore
3	Späne-Auffangblech / chip collecting tray / Bandeja recoge virutas / Tôle de collecte des copeaux / Vassoio raccogli-trucioli	**11**	Spannbacken-Set / clamping jaws for 3-jaw chuck / Juego de mordazas de sujeción / Ensemble de mors de serrage / Set griffe di serraggio
4	Werkzeugbox / toolbox / Caja de herramientas / Boîte à outils / Cassetta degli attrezzi	**12**	Feste Körnerspitze MK3 / dead centre MT3 / Punto fijo MK3 / Contrepointe fixe MK3 / Punzone a centro solido MK3
5	Backenfutterschlüssel / jaw chuck keys / Llave del mandril / Clé de mandrin de mors / Chiave per mandrino a griffe	**13**	Feste Körnerspitze MK2 / dead centre MT2 / Punto fijo MK2 / Contrepointe fixe MK2 / Contropunta fissa MK2

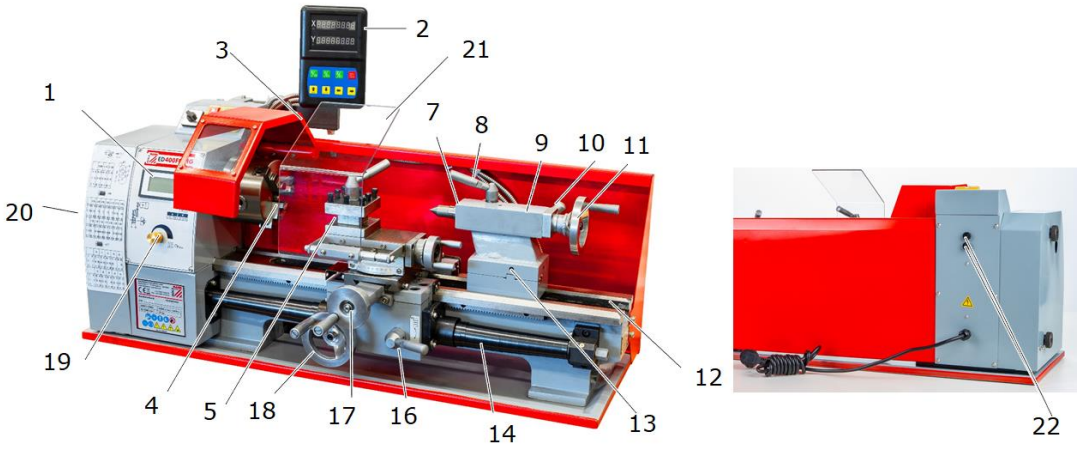
6	Inbusschlüssel-Set / set of hex key wrenches / Juego de llaves Allen / Set de clefs Allen / Set di chiavi a brugola	**14**	Wechsel-Zahnräder / change gears / Ruedas dentadas intercambiables / Pignons de rechange / Cambio ruote dentate
7	Doppelschraubenschlüssel / double ended wrenches / Llave de doble boca / Doubles clés plates / Chiave doppia	**15**	Kreuzschlitz- und Flachkopfschraubendreher / cross- und flat-screwdriver / Destornillador de estrella y destornillador de punta plana / Tournevis en croix et à tête plate / Cacciaviti a croce e a testa piatta
8	Reservehülsen für Zahnräder / spare sleeves for gear wheels / Casquillos de repuesto para engranajes/ Douilles de rechange pour pignons / Manicotti di ricambio per ruote dentate	**16**	Bedienungsanleitung / operation manual / Instrucciones de uso / Mode d'emploi / Manuale d'uso

3.1 Anzeige- und Bedienelemente / Display and Operating Controls / Elementos de visualización y de mando / Éléments d'affichage et de commande / Elementi attuatore e di comando



A	Drehrichtungsschalter (L/R) / direction-of-rotation switch (L/R) / Interruptor para el sentido de rotación (I/D) / Commutateur de sens de rotation (G/D) / Interruttore del senso di rotazione (S/D)
B	EIN(I)–AUS(0)–Schalter / ON(I)–OFF(0)-switch / Interruptor ON(I)–OFF(0) / INTERRUPTEUR (I) MARCHE-ARRÊT(0) / Interruttore ON(I)–OFF(0)
C	Drehzahlanzeige / speed indicator / Indicador de velocidad / Affichage de la vitesse de rotation / Indicatore numero di giri
D	Drehzahleinstellung, stufenlos / speed adjustment, infinitely / Ajuste de velocidad, de regulación continua / Réglage de la vitesse de rotation, en continu / Regolazione della velocità, a variazione continua
E	Schutzabdeckung Wechselgetriebe / change gear protective cover / Cubierta protectora de la caja de cambios / Cache de protection d'engrenage un changement de vitesse / Coperchio di protezione cambio
F	Gewindesteigungs-Tabelle / pitches table / Tabla de pasos de rosca / Tableau des pas de filetage / Tabella del passo della filettatura
G	Vorschubtabelle / feed rate table / Tabla de velocidad de avance / Tableau de vitesses / Tabella di avanzamento
H	Rändelschraube / knurled screw / Tornillo moleteado / Vis à tête moletée / Vite zigrinata

3.2 Komponenten / Components / Componentes / Composants / Tecniche



ED400FD | ED400FDDIG			
1	Spindelstock / headstock / Cabezal / Poupée fixe / Supporto del mandrino	**12**	Drehmaschinenbett / lathe bed / Bancada del torno / Banc de machine / Basamento del tornio
2	Digitale Positionsanzeige (nur bei Modell ED400FDDIG) / digital readout unit (only for model ED400FDDIG) / Indicador de posición digital (sólo en el modelo ED400FDDIG) / Affichage numérique de la position (uniquement pour le modèle ED400FDDIG) / Indicatore di posizione digitale (solo modello ED400FDDIG)	**13**	Verstellschraube Reitstock /tailstock adjusting screw / Tornillo de ajuste del contrapunto / Vis de réglage de la contrepointe / Vite di regolazione Contropunta
3	Drehfutterschutz / chuck guard / Protección del mandril del torno / Protection du mandrin du tour / Protezione del mandrino autocentrante	**14**	Leitspindel mit Spindelabdeckung / lead screw with cover / Husillo guía con cubierta / Vis-mère avec cache de broche / Vite madre con coperchio del mandrino
4	Spindel mit montiertem 3-Backenfutter / spindle with mounted 3-jaw chuck / Husillo con mandril de 3 mordazas montado / Broche avec triple mandrin de mors / Mandrino con mandrino a 3 griffe	**15**	Handrad Oberschlitten / handwheel top slide / Volante manual del carro superior / Volant du chariot à mouvements croisés / Volantino slitta superiore
5	Werkzeughalter / tool post / Portaherramientas / Porte-outil / Portautensili	**16**	Einrückhebel Vorschub • Gewinde / engaging lever feed thread / Palanca de engranaje de avance • rosca / Levier d'enclenchement d'avance • Filetage / Leva d'innesto avanzamento • filettatura
6	Spritzwand / bulkhead / Protector anti-salpicaduras / Cloison anti-projections / Paraspruzzi	**17**	Handrad Querschlitten / handwheel cross slide / Volante manual del carro transversal / Volant du chariot de coulisseau transversal / Volantino slitta trasversale
7	Reitstock-Pinole / tailstock spindle sleeve / Pinola del contrapunto / Fourreau de contrepointe / Bussola contropunta	**18**	Handrad Längsschlitten / handwheel longitudinal slide / Volante manual del carro longitudinal / Volant de chariot pour course longitudinale / Volantino slitta longitudinale
8	Klemmhebel Reitstockpinole / clamping lever tailstock spindle sleeve / Palanca de sujeción de la pinola del contrapunto / Levier de blocage du fourreau de contrepointe / Leva di serraggio bussola contropunta	**19**	Vorschubgetriebe / feed gear / Engranaje de avance / Engrenage d'avance / Meccanismo di avanzamento
9	Reitstock / tail stock / Contrapunto / Contrepointe / Contropunta	**20**	Wechselgetriebe / change gear / Caja de cambios / Engrenage à changement de vitesse / Cambio di velocità
10	Klemmhebel Reitstock / clamping lever tailstock / Palanca de sujeción del contrapunto / Levier de blocage de contrepointe / Leva di bloccaggio contropunta	**21**	Spritzschutz / Splash guard / Protección contra salpicaduras / Protection contre les éclaboussures / Protezione anti-spruzzi
11	Handrad Reitstockpinole/ handwheel tailstock spindle sleeve / Volante manual de la pinola del contrapunto / Volant du fourreau de contrepointe / Volantino bussola contropunta	**22**	2x Sicherung / 2x fuse / 2x fusible / 2x fusible / 2 Fusibili

3.3 Technische Daten / Technical Data / Datos técnicos / Données techniques / Dati tecnici

Parameter / parameters / parámetros / paramètres / Parametri	ED400FD | ED400FDDIG
Spannung (Frequenz) / Voltage (frequency) / Tensión (frecuencia) / Tensions (fréquence) / Tensione (frequenza)	230 V (50 Hz)
Motorleistung S1 /S6 (40%) ; motor power S1 /S6 (40%) Potencia del motor S1/S6 (40%) ; Puissance moteur S1/S6 (40%); Potenza del motore S1 /S6 (40%)	450 W / 630 W
Spitzenweite / max. distance between centers / Distancia entre puntas / Entrepointes / Distanza tra le punte	400 mm
Bettbreite / bed width / Anchura de la bancada / Largeur du banc / Larghezza del basamento	100 mm
Spindeldrehzahlbereich / Spindle speed / Rango de velocidades del husillo / Plage de vitesse de rotation de la broche / Gamma di velocità del mandrino	50–2500 min^{-1}
max. Drehdurchmesser über Maschinenbett / max. swing over bed / Diámetro máx. de torneado sobre la bancada de la máquina / Diamètre max. de rotation au-dessus du banc de machine / Diametro massimo di tornitura sul basamento della macchina	210 mm
max. Drehdurchmesser über Support / max. swing over cross slide / Diámetro máx. de torneado sobre el carro/ Diamètre max. de rotation au-dessus du chariot / Diametro massimo di tornitura sul supporto	134 mm
Spindelbohrung / spindle bore / Diámetro interior del husillo/ Alésage de broche / Foro del mandrino	21 mm
Spindel Konus / spindle taper / Cono del husillo / Cône de broche / Mandrino cono	MK3 / MT3
Reitstock Konus / tailstock taper / Cono del contrapunto / Cône de contrepointe / Contropunta cono	MK2 / MT2
Längsvorschub (Stufen) / longitudinal feed / Avance longitudinal (pasos) / Avance longitudinale (étages) / Alimentazione longitudinale (passi)	0.089 – 0.198 mm/U
Gewindesteigung metrisch (Stufen) / range of metric threads (steps) / Paso de rosca métrico (pasos) / Pas de filetage métrique (étages) / Passo della filettatura metrico (gradini)	0.5–3 mm (14)
Gewindesteigung in Zoll / range of inch threads / Paso de rosca en pulgadas / Pas de filetage en pouce / Passo della filettatura in pollici	8–44 TPI (10)
Verfahrweg Längsschlitten (Z_0-Axis) / total travel longitudoinal slide (Z_0-Axis) / Desplazamiento carro longitudinal (eje Z_0) / Course de déplacement de chariot pour course longitudinale (axe Z_0) / Traiettoria di traslazione slitta longitudinale (Asse Z_{0-})	376 mm
Verfahrweg Querschlitten (X-Achse) / total travel cross slide (X-Axis) / Desplazamiento carro transversal (eje X) / Course de déplacement de coulisseau transversal (axe X) / Traiettoria di traslazione a croce (asse X)	80 mm
Verfahrweg Oberschlitten (Z_1-Axis) / total travel top slide (Z_1-Axis) / Desplazamiento carro superior (eje Z_1) / Course de déplacement de chariot à mouvements croisés (axe (Z_1) / Traiettoria di traslazione slitta superiore (Asse Z_{1-})	55 mm
max. Werkzeugaufnahme / max. tool holder cross section / Sección transversal máx. del portaherramientas / Raccordement max. d'outil / Portautensili max	10 mm
Reitstock-Pinolenhub / stroke of tailstock / Carrera de la pinola del contrapunto / Corsa dell'albero della contropunta/corsa bussola contropunta	55 mm
Länge des Anschlusskabels / Longitud del cable de conexión / Longueur du câble de branchement / Lunghezza del cavo di collegamento	170 cm
Netto-Gewicht / net weight / Peso neto / Poids net / Peso netto	68kg (ED400FD) ; 70 kg (ED400FDDIG)
Brutto-Gewicht / gross weight / Peso bruto / Poids brut / Peso lordo	75 kg (ED400FD) ; 77 kg (ED400FDDIG)
Verpackungsmaße L x B x H) / packaging dimensions (L x W x H) / Dimensiones del embalaje L x A x H) / Dimensions de l'emballage (L x l x H) / Dimensioni L x P x A	900 x 450 x 450 mm
Maschinenmaße (L x B x H)/ machine dimensions (L x W x H) / Dimensiones de la máquina L x A x H) / Dimensions de la machine (L x l x H) / Dimensioni macchina (L x P x A)	940 x 380 x 345 mm

15 PREFACE (EN)

Dear customer!

This operating manual contains information and important notes for safe start-up and handling of the metal lathes ED400FD and ED400FDDIG, hereinafter each referred to as "machine".

The manual is an integral part of the machine and must not be removed. Keep it for later use in a suitable place, easily accessible to users (operators), protected from dust and moisture, and enclose it with the machine if the machine is passed on to third parties!

Please pay special attention to the chapter Safety!

Due to the constant further development of our products, illustrations and contents may differ slightly. If you notice any errors, please inform us.

Subject to technical changes!

Check the goods immediately after receipt and note any complaints on the consignment note when taking over the goods from the deliverer!

Transport damage must be reported separately to us within 24 hours.

HOLZMANN cannot accept any liability for unnoticed transport damage.

Copyright

The place of jurisdiction shall be the Regional Court of Linz or the court responsible for 4170 Haslach.

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16 SAFETY

This section contains information and important notes on safe start-up and handling of the machine.

For your own safety, read these operating instructions carefully before putting the machine into operation. This will enable you to handle the machine safely and prevent misunderstandings as well as personal injury and damage to property. In addition, observe the symbols and pictograms used on the machine as well as the safety and hazard information!

16.1 Intended Use of the Machine

The machinery is intended exclusively for the following operations: longitudinal and face turning of round or regularly shaped 3-, 6- or 12-sided workpieces of plastic, metal or similar materials which are not hazardous to health, flammable or explosive, each within the specified technical limits.

HOLZMANN MASCHINEN assumes no responsibility or warranty for any other use or use beyond this and for any resulting damage to property or injury.

16.1.1 Technical Restrictions

The machine is intended for use under the following ambient conditions:

Rel. Humidity:	max. 70 %
Temperature (Operation)	+5° C bis +40° C
Temperature (Storage, Transport)	-20° C bis +50° C

16.1.2 Prohibited Applications / Hazardous Misapplications

- Operating the machine without adequate physical and mental aptitude
- Operating the machine without knowledge of the operating instructions
- Changes in the design of the machine
- Use of emery cloth by hand
- Operating the machine outdoors
- Operating the machine in a potentially explosive environment (machine can generate ignition sparks during operation)
- Operating the machine outside the technical limits specified in this manual
- Remove the safety markings attached to the machine.
- Modify, circumvent or disable the safety devices of the machine.

The improper use or disregard of the versions and instructions described in this manual will result in the voiding of all warranty and compensation claims against Holzmann Maschinen GmbH.

16.2 User Requirements

The machine is designed for operation by one person. The physical and mental aptitude as well as knowledge and understanding of the operating instructions are prerequisites for operating the machine. Persons who, because of their physical, sensory or mental abilities or their inexperience or ignorance, are unable to operate the machinery safely must not use it without supervision or instruction from a responsible person.

Basic knowledge of metalworking especially the correlation of material, tool, feed and speeds.

Please note that local laws and regulations may determine the minimum age of the operator and restrict the use of this machine!

Put on your personal protective equipment before working on the machine.

Work on electrical components or equipment may only be carried out by a qualified electrician or under the instruction and supervision of a qualified electrician.

16.3 Safety Devices

The machine is equipped with the following safety devices:

<table>
<tr><td>  </td><td>  </td><td>• a jaw chuck guard with position switch. The machine can only switches on when the guard is closed.</td></tr>
<tr><td>  </td><td>  </td><td>• a protective cover for gearbox with microswitch.</td></tr>
<tr><td colspan="2"></td><td>• a spiral spring as a protective cover on the lead screw to prevent clothing from being drawn in.</td></tr>
</table>

16.4 General Safety Instructions

To avoid malfunctions, damage and health hazards when working with the machine, the following points must be observed in addition to the general rules for safe working:

- Before start-up, check the machine for completeness and function. Only use the machine if the guards and other non-parting guards required for machining have been fitted, are in good operating condition and have been properly maintained.
- Choose a level, vibration-free, non-slip surface for the installation location.
- Ensure sufficient space around the machine!
- Ensure sufficient lighting conditions at the workplace to avoid stroboscopic effects.
- Ensure a clean working environment.
- Only use perfect tools that are free of cracks and other defects (e.g. deformations).
- Remove tool keys and other adjustment tools before switching on the machine.
- Keep the area around the machine free of obstacles (e.g. dust, chips, cut parts, etc.).
- Check the strength of the machine connections before each use.
- Never leave the running machine unattended. Switch off the machine before leaving the working area and secure it against unintentional or unauthorised recommissioning.
- The machine may only be operated, serviced or repaired by persons who are familiar with it and who have been informed of the hazards arising from this work.
- Ensure that unauthorised persons maintain a safe distance from the machine and keep children away from the machine.
- When working on the machine, never wear loose jewellery, loose clothing, ties or long, open hair.
- Hide long hair under hair protection.
- Wear close-fitting protective clothing and suitable protective equipment (eye protection, dust mask, ear protection; gloves only when handling tools).
- Metal dust can contain chemical substances that can have a negative effect on health. Work on the machine should only be carried out in well-ventilated rooms. If necessary, use a suitable extraction system.
- If there are connections for dust extraction, make sure that they are properly connected and in working order.
- Always work with care and the necessary caution and never use excessive force.
- Do not overload the machine!
- Shut down the machine and disconnect it from the power supply before carrying out any adjustment, conversion, cleaning, maintenance or repair work. Before starting any work

on the machine, wait until all tools or machine parts have come to a complete standstill and secure the machine against unintentional restarting.
- Do not work on the machine if it is tired, not concentrated or under the influence of medication, alcohol or drugs!
- Do not use the machine in areas where vapours from paints, solvents or flammable liquids represent a potential danger (danger of fire or explosion!).

16.5 Electrical Safety

- Make sure that the machine is earthed.
- Only use suitable extension cords.
- Proper plugs and sockets reduce the risk of electric shock.
- The machine may only be used if the power source is protected by a residual current circuit breaker.

16.6 Special Safety Instructions for Lathes

- Clamp the workpiece firmly before turning on the lathe.
- Clamp the lathe tool to the correct height and as short as possible.
- Do not wear gloves when turning!
- Keep sufficient distance from all rotating parts.
- Switch off the lathe before measuring the workpiece.
- Remove the clamping key from the chuck after each tool change.
- Never remove any chips by hand! Use a chip hook, rubber wiper, hand brush or brush.
- When using cooling lubricants, observe the manufacturer's instructions and use a skin protection agent if necessary.

16.7 Hazard Warnings

Despite intended use, certain residual risks remain when operating the machine. Due to the design and construction of the machine, hazardous situations may occur which are identified as follows in these operating instructions:

DANGER
 A safety instruction designed in this way indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING
 Such a safety instruction indicates a potentially hazardous situation which, if not avoided, may result in serious injury or even death..

CAUTION
 A safety instruction designed in this way indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE
 A safety notice designed in this way indicates a potentially hazardous situation which, if not avoided, may result in property damage.

16.8 Residual risks

- Formation of a flow chip
  - This wraps around the forearm and causes severe cuts.
- Throwing away workpieces or tools at high speed.
  - Always check workpieces for suitability and clamp them securely and firmly
  - Clamp and center longer workpieces via an additional counter bearing (e.g. tailstock)
  - For very long workpieces, use a steady rest

Irrespective of all safety regulations, your common sense and appropriate technical suitability/training are and will remain the most important safety factor for error-free operation of the machine. Safe working primarily depends on you!

17 TRANSPORT

WARNING

Damaged or insufficiently strong hoists and load slings can result in serious injury or even death. Before use, therefore, check hoists and load slings for adequate load-bearing capacity and perfect condition. Secure the loads carefully. Never stand under suspended loads!

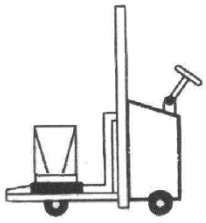
CAUTION

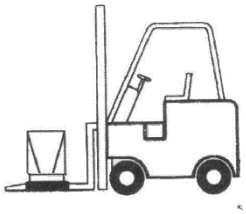
The lathe is heavy! At least two persons are required to carry the lathe!

NOTICE

Avoid using sling chains as there is a risk of damaging the lead screw. Ensure that the lead screw is not touched by the lifting slings when lifting. Never lift the machine by the lead screw!

To ensure proper transport, also observe the instructions and information on the transport packaging regarding centre of gravity, attachment points, weight, means of transport to be used and the prescribed transport position, etc.





Transport the machine in its packaging to the installation site. To manoeuvre the machine in the packaging, a pallet truck or a forklift truck with the appropriate lifting force can be used.

Before lifting the machine, check that the tailstock is clamped. If necessary, change the position of the bed carriage and/or tailstock to obtain a balanced load stop.

If you are transporting the lathe with a vehicle, ensure that the load is secured accordingly!

18 ASSEMBLY

18.1 Preparatory activities

18.1.1 Checking Delivery Content

Always note visible transport damage on the delivery note and check the machine immediately after unpacking for transport damage or missing or damaged parts. Report any damage to the machine or missing parts immediately to your retailer or freight forwarder.

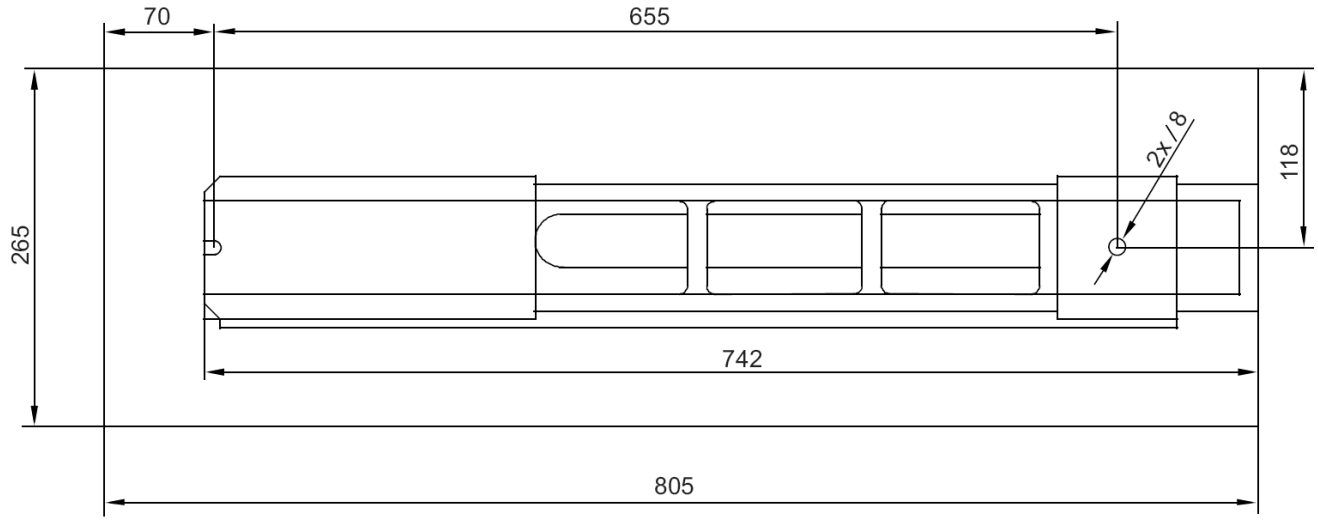
18.1.2 Site Requirements

NOTICE

Insufficient rigidity of the ground leads to the superposition of vibrations between the lathe and the ground (natural frequency of components). If the stiffness of the overall system is insufficient, critical speeds are quickly reached, which leads to poor turning results.

Select a suitable installation location for the machine.
The place of installation should have:

- adequate lighting.
- a plain, level floor with minimum vibration values (e.g. concrete).
- The machine itself should be mounted on a solid work surface that is also straight and low-vibration (e.g. solid workbench).



The exact space required and the required load-bearing capacity of the ground result from the technical data (dimensions, weight) of your machine. When designing the working area around the lathe, observe the local safety regulations. When dimensioning the required space, take into account that the operation, maintenance and repair of the machine must be possible without restrictions at all times.
The selected installation location must have a suitable connection to the electrical mains (230 V / 50 Hz) with appropriate fuse (16 A).
After the machine has been installed at the intended location, it must be aligned.

18.1.3 Surface Preparation

NOTICE

The use of paint thinners, petrol, aggressive chemicals or abrasives leads to material damage to the surfaces! Therefore use only mild detergents.

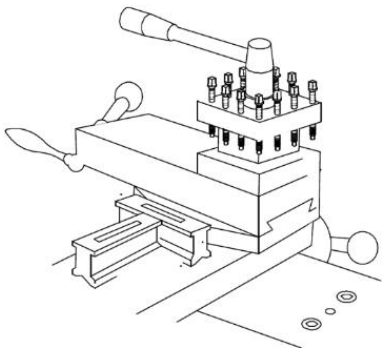
Remove the preservative applied to protect the bare parts without painting from corrosion. This can be done with usual solvents. Never use nitro thinner or other cleaning agents that could attack the machine's paintwork or water for cleaning.

Treat the bare machine parts (e.g. machine bed, tailstock sleeve, feed spindle) with an acid-free lubricating oil.

18.1.4 Fastening the Digital Read Out (only for model ED400FDDIG)

The digital read out (DRO) has to be mounted onto the machine before usage (see picture on the left). and the cables have to be connected via the plug connections.

18.1.5 Aligning the Lathe

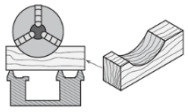


After installation and commissioning, it is recommended to check the alignment and levelling of the machine before using it for the first time. In order to ensure working accuracy, the alignment and levelling should be repeated at regular intervals.

To level the machine, use a precision spirit level according to DIN 877 with an accuracy of ±0.02 mm or ±0.04 mm to 1000 mm. This allows the horizontal position of the machine axis to be checked with sufficient accuracy in both the longitudinal and transverse directions.

Repeat the horizontal check a few days after initial commissioning and every six months thereafter.

18.1.6 Checking the Jaw Chuck

NOTICE		
		Do not use cast iron chucks. Use ductile iron chucks only. Before disassembling the jaw chuck, place a stable board or chuck cradle under the spindle to protect the precision-ground surfaces.

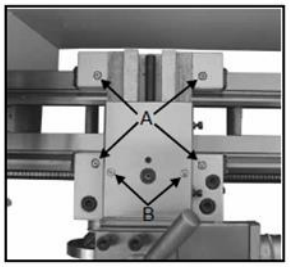
18.1.7 Visual Inspection

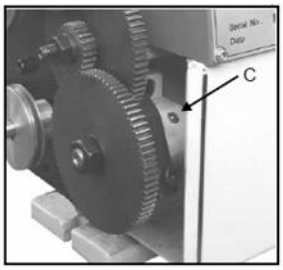
NOTICE	
	The machine is delivered without lubricant! These must be filled or applied before the lathe is put into operation. Non-observance can lead to serious damage to the machine. For running operation, use a viscous oil with viscosity ISO 220 (e.g. GOE5L) or a comparable SAE140 oil or a multi-purpose grease of class 2NLGI for lubrication.

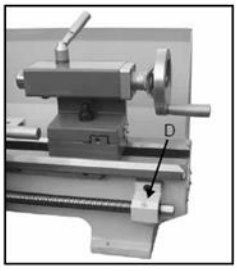
NOTICE		
		Lubricants are toxic and must not be released into the environment! Follow the manufacturer's instructions and contact your local authority if necessary for information on proper disposal.

The lubrication points bed slideway, dovetail guide cross slide, dovetail guide longitudinal slide and tailstock spindle sleeve are lubricated with the aid of an oil can and a commercially available oil can while moving the slide or the quill back and forth.

Lubricating Points:







A: lathe slide	**B**: cross slide	**C**: gear	**D**: lead screw

18.2 Power Supply

The machine is designed for operation with single-phase alternating current (230 V/~/50 Hz) and has protective insulation.

- Make sure that the mains voltage at the installation site matches the one on the nameplate.
- Make sure that the power source is protected by a residual current circuit breaker.
- Connect the unit only to a properly grounded outlet.
- The connecting cable or plug may only be replaced by the manufacturer or its customer service or comparable qualified persons.
- When using an extension cable, make sure that the extension cable has a cross-section of at least 1.5 mm^2. The extension cord must be unwound completely from the cable drum.

19 OPERATION

19.1 Before Start-up

- Oil all bare machine parts with an acid-free lubricating oil.
- Check the function of the moving and fixed parts.
- Lubricate the lathe according to the lubrication schedule.
- Check all spindles for smooth running.
- Check that the fixing screws of the lathe chuck are tight.
- Clamp a workpiece in the lathe chuck or turn the chuck jaws completely together before switching on the lathe.

19.2 Retracting the Machine

Retraction should be carried out at the lowest spindle speed. Run the machine at this speed for about 20 minutes. Check for irregularities, such as unusual noises, unbalance, etc. If everything is OK, gradually increase the speed.

19.3 Operating Instructions

NOTICE		
		Set the speed governor to the lowest setting at each start. Failure to observe this warning will result in damage to the engine and loss of warranty!

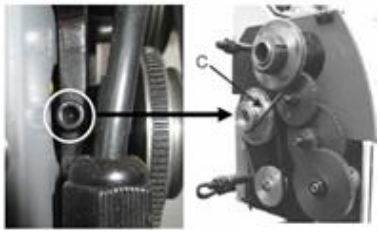
19.4 Operation

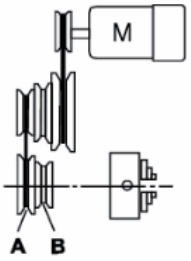
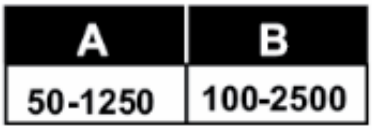
19.4.1 Starting / Stopping the Engine

	To start press the green button ″I″ To stop, press the red button ″0″

19.4.2 Selecting Spindle Speed Range

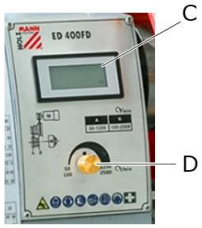
The machine can be operated within two speed ranges (A, B). To change the speed range, the drive belt must be turned over:

	• Loosen and remove the two knurled screws (H) on the headstock guard and remove the gear cover.
	• Loosen the marked hexagon socket screw (left behind drive wheel) and loosen the belt (C). • Place the V-belt C on the corresponding belt pulleys.

	• There are 2 positions (see illustration on the left): A and B
	• Position A (outer pulleys): 50-1.250 min-1 • Position B (inner pulleys): 100-2.500 min-1

After replacing the belt, tension the belt and refit the cover!

19.4.3 Adjusting the Spindle Speed

	The speed (low/high) within a speed range is selected by means of the speed controller (D). The current speed is displayed on the speed display (C).

19.4.4 Setting the Direction of Spindle Rotation

NOTICE

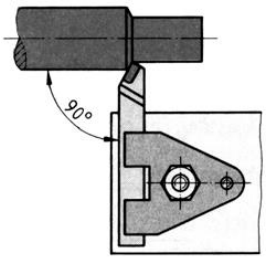
Before changing the direction of rotation, always wait for the machine to come to a standstill, otherwise the machine may be damaged!

	Switch the rotating direction switch (1) to the position ″F″ for counterclockwise spindle operation and to the position ″R″ for clockwise spindle operation. The position ″O″ is set to idle.

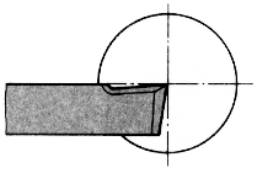
19.4.5 Clamping the tool in the tool holder

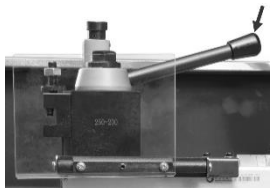
The main function of the tool holder is to fix the tool. If necessary, the tool holder can also hold more than one tool (maximum 4).

When inserting the tool, make sure that the cutting head of the tool points in the direction of the rotation axis of the workpiece.

	Clamp the turning tool into the tool holder. The turning tool must be clamped as short and tightly as possible in order to be able to absorb the cutting force occurring during chip formation well and reliably. Also ensure that the turning tool is clamped at right angles to the axis of rotation (see illustration on the left). When clamping at an angle, the turning tool can be pulled into the workpiece.

Align the turning tool in height. Use the tailstock with centring point to determine the required height. If necessary, place steel supports under the lathe tool to obtain the required height.

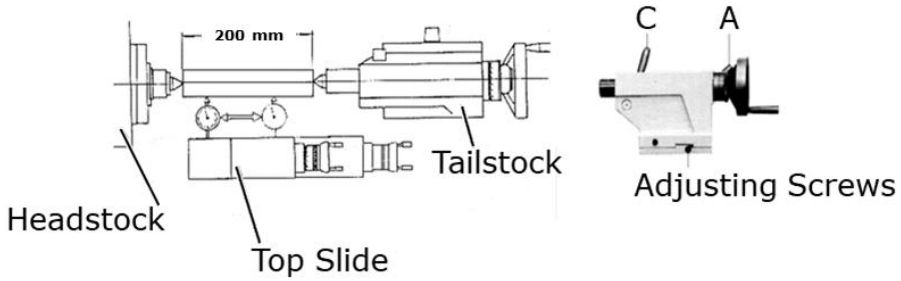
	The cutting edge of the turning tool must be set exactly to centre height during facing so that the face is free of studs. Facing produces flat surfaces perpendicular to the workpiece axis of rotation. A distinction is made between transverse face turning, transverse cut-off turning and longitudinal face turning.

	If the tool holder must be turned, open the clamping lever by turning it counterclockwise. Turn the tool holder to the desired position and then tighten it again by turning the clamping lever clockwise.

19.4.6 Mounting Steady/Follow Rest

Use a steady and/or follow rest when the cutting force of the turning tool is likely to cause the turned part to deflect.

19.4.7 Levelling Tailstock to Headstock



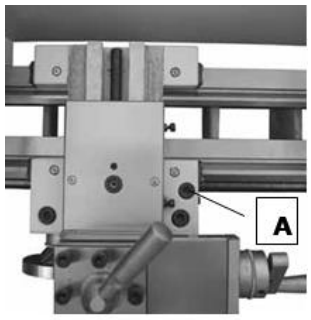
Clamp a 200 mm long solid pipe piece correctly between the spindle and tailstock.

Now clamp a dial indicator into the tool holder.

Use the manual feed (handwheel) to guide the top slide along the workpiece. If there are measuring differences, adjust the tailstock to the headstock using the adjusting screw so that the measuring differences no longer appear on the tailstock.

19.4.8 Carriage Lock

NOTICE	
	Carriage lock screw must be unlocked before engaging automatic feeds or damage to lathe may occur!



For manual operation, the bed slide can be clamped as follows:

- Turn hex socket cap screw (**A**) clockwise and tighten to lock.
- Turn counter-clockwise and loosen to unlock.

19.4.9 Manual Operation

The lathe slide is moved by the handwheel (18), the cross slide by the handwheel (17) and the top slide by the handwheel (15).

19.4.10 Turning with Automatic Feed

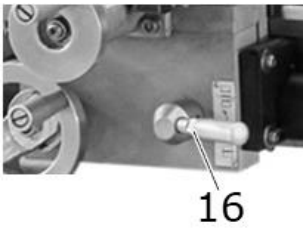
CAUTION

By turning on the lathe at a high speed dial and activated A-release lever, the saddle is moved at high speed.

HINWEIS

The clamping of the lathe slide must be unlocked before you turn on the automatic feed!

Use the tables to select and set the desired feed rate or speed.
If necessary, change the gear wheels. The combination of the gears is indicated in the threading table.



Automatic longitudinal feed:

- Press the feed/thread engagement lever (16) downwards to switch on the automatic longitudinal feed.
- If the lever is pulled upwards, the automatic longitudinal feed is stopped.

19.4.11 Replacing Change Gears

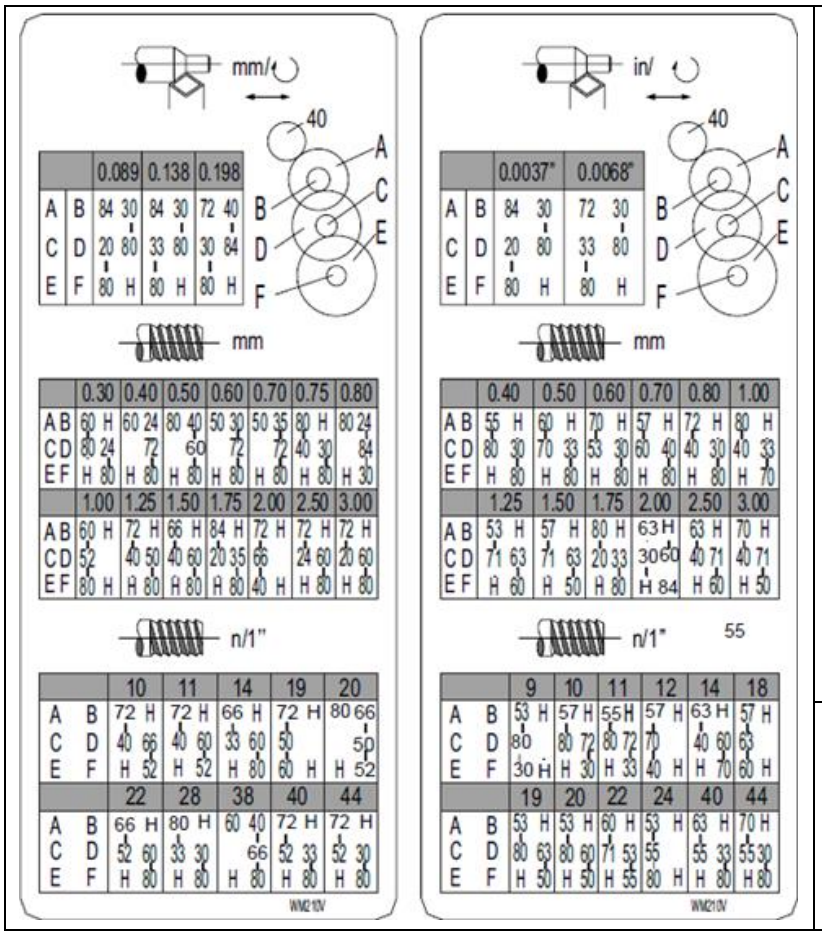
1. Disconnect the device from the power source.
2. Loosen the two knurled screws and remove the protective cover.
3. Loosen the locking screw (B) of the change wheel bracket.
4. Swivel the change gear bow (C) to the right.
5. Unscrew the nut (D) from the spindle or loosen the nuts (E) and remove the change gears.
6. Install the new change gears.
7. Swivel the change gear bow to the left until the gears engage again.
8. Fix the change gear bow again with the locking screw.
9. Install the protective cover and connect the unit to the power supply.

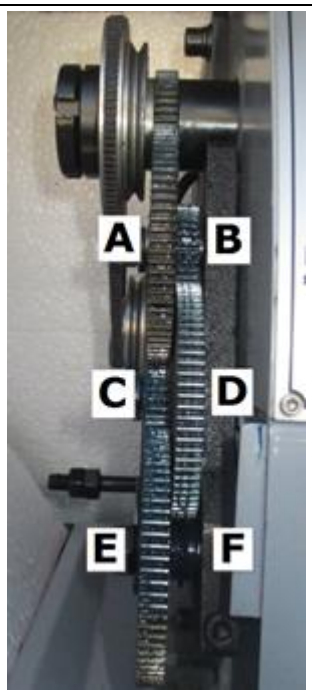
19.4.12 Threading

During operation the lead screw rotates.
If you insert the feed / thread engagement lever (16) downwards, the lathe slide moves.

19.4.13 Setting the feed rate and thread pitches

To select the longitudinal feed and to adjust metric or English threads, use the corresponding tables on the left of the machine.





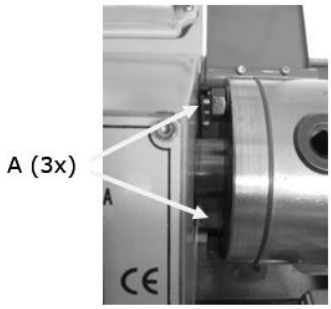
INFO:
Change gears are replaced according to the letters in the table, as shown in the illustration above.

Thread Pitch 1,5 mm			
A	B	66	H
C	D	40	60
E	F	H	80

- The gear spindle gear with 40 teeth thumbs up in gear A
- Gear A engages in gear C
- Gear D meshes with gear F

"H" stands for white space (sleeve). Instead of a sleeve can also smaller gear are used, that is with no other gear is engaged.

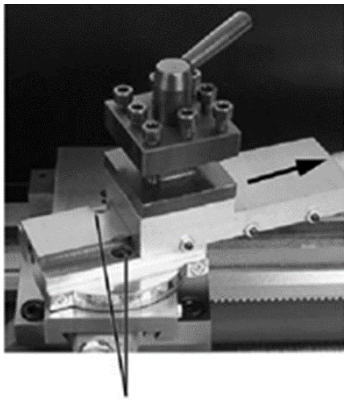
19.4.14 Lathe Chuck / Face Plate Assembly



If you want to mount or dismount the lathe chuck or a face plate, first make sure that the retaining cams are fixed.

- Loosen the three screws (A) and remove the lathe chuck.
- Now mount the chuck or face plate on the spindle head and tighten the screws one after the other.
- Do not exchange chucks or face plates between different lathes without checking the correct holding cams.

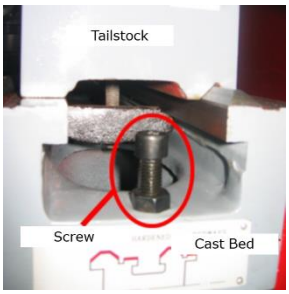
19.4.15 Top Slide



Adjusting Screws (1)

- For angular adjustment of the upper slide, loosen the screws, turn the carriage to the desired position and fix the carriage again with the screws.

19.4.16 Tailstock



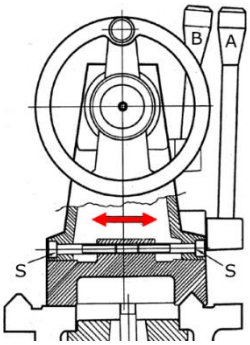
The tailstock serves as a counter bearing when turning between the centres as well as for holding drilling, countersinking and reaming tools. It is guided on the cheeks of the lathe bed and can be clamped at any point by a clamping lever.

The tailstock is secured in the lathe bed (cast bed) with an end position stop screw to prevent the tailstock from sliding out unintentionally (see picture on the left).

Tailstock crossover

The tailstock spindle sleeve can be moved by a threaded spindle and a handwheel and can be clamped with a clamping lever. An inner taper in the quill accommodates the centering point, a drill chuck or tools with a tapered shank.

- Clamp your required tool into the tailstock sleeve.
  → Use the scale on the sleeve (graduation 0.02 mm) for adjustment and/or readjustment.
- Clamp the sleeve with the clamping lever.
  → Use the handwheel to retract and extend the quill.



The transverse displacement of the tailstock is required when turning long, conical bodies.

Loosen the tailstock clamping lever (A) and the adjusting screws (S) on the left and right of the tailstock.

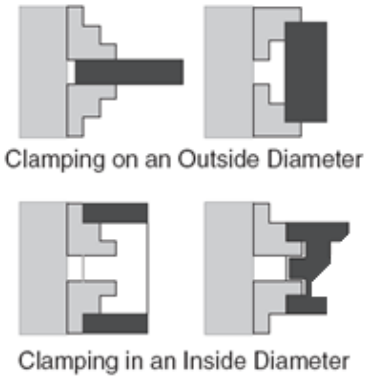
The desired transverse offset (approx. ± 15 mm) can be set using the scale on the back of the tailstock.

Finally retighten the clamping lever and adjusting screws.

19.5 General Working Instructions

19.5.1 3-Jaw Chuck

The 3-jaw chuck supplied with your lathe is a scroll chuck, i.e. all three jaws move uniformly when the chuck key is turned. This jaw configuration is used to hold concentric workpieces that are centred with the same pressure from all three jaws. A set of reversible top jaws is also included to allow additional workpiece configurations.

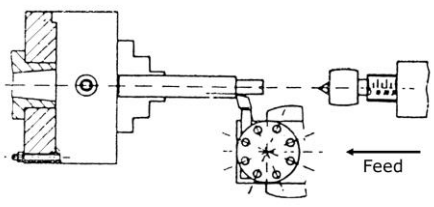
	Both sets of jaws can accommodate a workpiece on both the inside and outside - see illustration on the left. Regardless of how you configure the jaws, make sure the workpiece is firmly clamped in the jaw chuck.

Clamping the workpiece

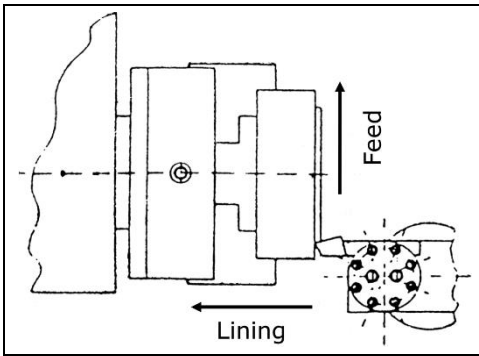
1. Disconnect the lathe from the mains.
2. Place a stable board or chuck cradle under the spindle to protect the precision-ground surfaces.
3. Insert the chuck key into a scroll groove and turn it counterclockwise to open the jaws until the workpiece lies flat on the clamping surface or evenly on the jaw steps or fits into the chuck hole and through the spindle hole.
4. Close the jaws until they make light contact with the workpiece.
5. Turn the chuck by hand to ensure that the workpiece is held evenly by all three jaws and centred on the chuck.

If the workpiece is not centred, release the jaws and realign the workpiece. Retighten the jaws and repeat step 5. When the workpiece is centred, fully tighten the jaws.

19.5.2 Longitudinal Turning

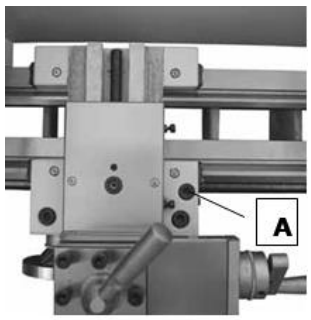
	During facing, the planer tool is moved parallel to the axis of rotation. The feed is carried out either manually by turning the handwheel on the lathe slide or on the upper slide or by switching on the automatic feed. The infeed for the cutting depth is effected via the cross slide.

19.5.3 Plain Turning and Recessing



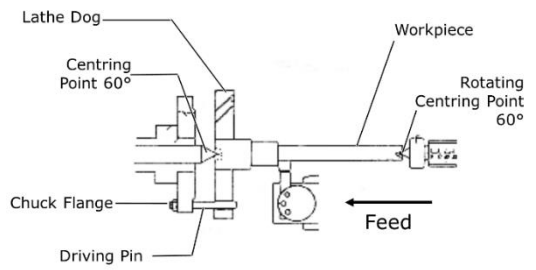
When facing, the turning tool is moved at right angles to the axis of rotation. The feed is done manually with the handwheel of the facing slide. The feed of the cutting depth is effected by the top slide or the bed slide.

19.5.4 Fixing the Lathe Slide



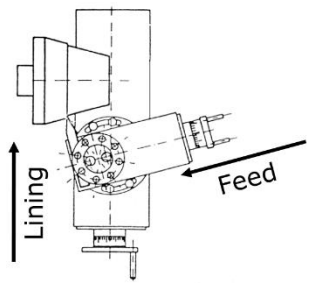
The cutting force occurring during facing, grooving or cutting-off operations can cause the lathe slide to move. Therefore fasten lathe slide with the fixing screw.

19.5.5 Turning between Tips



Workpieces that require a high concentricity are machined between the tips. A centre hole is drilled in both face turned faces of the workpiece. The turning heart is clamped onto the workpiece. The driving pin, which is screwed into the chuck flange, transmits the torque to the rotary heart. The fixed centering point is located in the centre hole of the workpiece on the spindle head side. The rotating center point is located in the centering hole of the workpiece on the tailstock side.

19.5.6 Turning Short Taper with the Top Slide

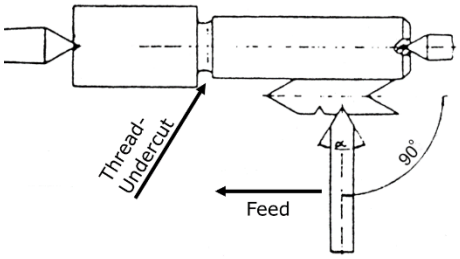


The short taper is turned by hand with the top slide. The upper slide is swivelled according to the desired angle. The infeed takes place with the cross slide:

1. Loosen the two clamping screws at the front and rear of the upper slide.
2. Turn the upper slide to the desired position.
3. Clamp the upper slide again.

19.5.7 Thread Cutting

Threading or tapping requires good turning skills and sufficient experience from the operator.



Example Outside Thread:

- The workpiece diameter must be turned to the diameter of the desired thread.
- The workpiece requires a chamfer at the beginning of the thread and an undercut at the end of the thread.
- The speed must be as low as possible.
- The thread chisel must correspond exactly to the thread form, be absolutely right-angled and clamped exactly to the turning centre.
- The engagement lever for thread cutting must remain closed during the entire thread cutting process. Excluded are the thread pitches which can be carried out with the tapping watch.
- The thread is produced in several cutting operations, so that the turning tool must be completely turned out of the thread (with the facing slide) at the end of a cutting operation.
- The return path is made with the clasp nut closed and the thread turning tool not engaged by actuating the "Shift lever Direction of rotation".
- Switch off the lathe and reposition the chisel in small cutting depths with the cross slide.
- Before each run, adjust the upper slide by approx. 0.2 to 0.3 mm alternately to the left and right in order to free the thread. The thread chisel therefore only cuts on one thread flank in each pass. Do not cut free until shortly before reaching the full thread depth.

20 CLEANING

NOTICE

Wrong cleaning agents can attack the varnish of the machine. Do not use solvents, nitro thinners, or other cleaning agents that could damage the machine's paint. Observe the information and instructions of the cleaning agent manufacturer!

Prepare the surfaces and lubricate the bare machine parts with an acid-free lubricating oil. Regular cleaning is a prerequisite for the safe operation of the machine and its long service life. Therefore, clean the device after each use of chips and dirt particles.

21 MAINTENANCE

WARNING

Danger due to electrical voltage! Handling the machine with the power supply up may result in serious injury or death. Always disconnect the machine from the power supply before servicing or maintenance work and secure it against unintentional restart!

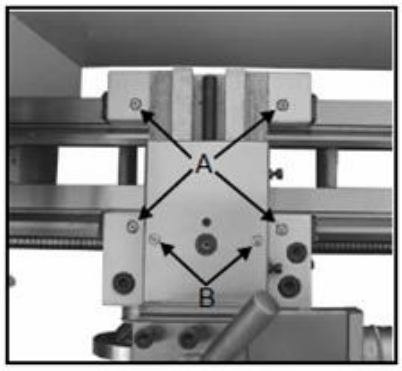
The machine is low-maintenance and only a few parts have to be serviced. Nevertheless, any faults or defects which may affect the safety of the user must be rectified immediately!

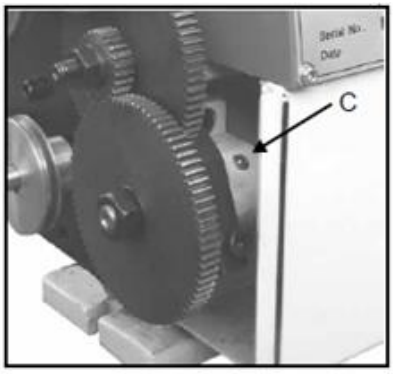
- Before each start-up, make sure that the safety devices are in perfect condition and function properly.
- Check all connections for tightness at least once a week.
- Regularly check that the warning and safety labels on the machine are in perfect and legible condition.
- Use only proper and suitable tools.
- Only use original spare parts recommended by the manufacturer.

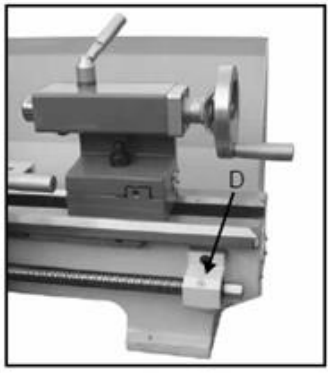
21.1.1 Lubricating

Lubricate the lathe every 10 operating hours. The lubrication points bed slideway, dovetail guide cross slide, dovetail guide longitudinal slide and tailstock spindle sleeve are lubricated with the aid of an oil can and a standard lubricating oil (ISO 32) while moving the slide or sleeve back and forth.

Lubricating Points:

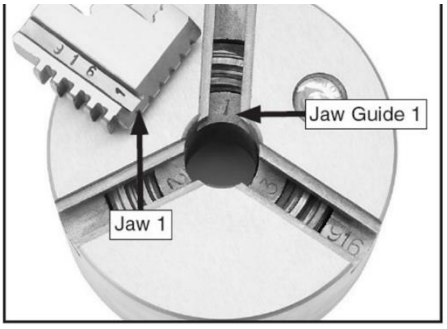


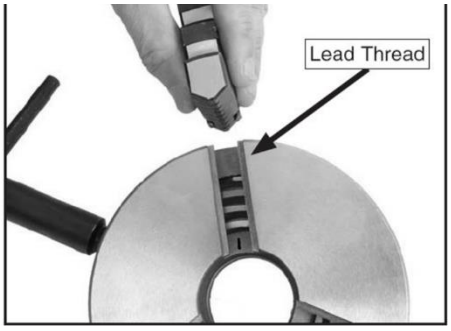




A: lathe slide **B**: cross slide	**C**: gear	**D**: lead screw

21.1.2 Replacing Jaws





To replace the jaws, you must open the lathe chuck with the chuck key. In the fully open position, the jaws can then be removed one by one.

The following must be observed when inserting the jaws:

- The threaded segments of the jaws are graduated as shown in the figure above.
- In addition, they are numbered from 1 to 3 to indicate the actual pitch in the lathe chuck.

Therefore, make sure to mount the jaws in the correct order:

1. Arrange the jaws as shown in the figure above and insert them clockwise into the slots of the lathe chuck in this order.
2. Hold the jaws and clamp them with the chuck key.
3. Close the chuck completely and check that the jaws meet in the middle.

If a jaw does not fit properly, open the lathe chuck, press firmly on the jaw and turn the chuck key until the jaw is in the correct position. Check again that the jaws meet in the middle.

22 STORAGE

NOTICE

Improper storage can damage and destroy important components. Only store packed or unpacked parts under the intended environmental conditions!

When the machine is not in use, store it in a dry, frost-proof and lockable place to prevent the formation of rust on the one hand and to ensure that unauthorised persons and in particular children have no access to the machine on the other hand.

23 DISPOSAL

Observe the national waste disposal regulations. Never dispose of the machine, machine components or equipment in residual waste. If necessary, contact your local authorities for information on the disposal options available.
If you buy a new machine or an equivalent device from your specialist dealer, he is obliged in certain countries to dispose of your old machine properly.

24 TROUBLESHOOTING

WARNING

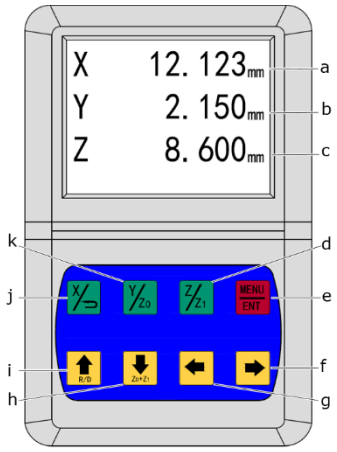
Danger due to electrical voltage! Manipulating the machine with the power supply up may result in serious injury or death. Before carrying out any troubleshooting work, always disconnect the machine from the power supply and secure it against unintentional recommissioning.

Many possible sources of error can be excluded in advance if the machine is properly connected to the mains. If you are unable to carry out necessary repairs properly and/or do not have the required training, always consult a specialist to solve the problem.

Fault	Possible Cause	Remedy
Machine does not start	▪ Machine is not connected ▪ Fuse or contactor broken ▪ Cable damaged ▪ Safety device not locked	▪ Check all electrical connections ▪ Change fuse, activate contactor ▪ Replace cable ▪ Check spindle protection / gearbox cover
Machine does not reach speed	▪ Extension cable too long ▪ Motor not suitable for existing voltage ▪ weak power network	▪ Exchange to suitable extension cable ▪ See switch box cover for correct wiring ▪ Contact electrician
Machine vibrates strongly	▪ Stands on uneven ground ▪ Motor mounting is loose	▪ Neu einrichten ▪ Befestigungsschrauben anziehen
Lathe tool has a short tool life	▪ Hard cast skin ▪ Too high cutting speed ▪ Too large infeed ▪ Too little cooling	▪ Break casting skin beforehand ▪ Choose lower cutting speed ▪ Lower infeed (finishing allowance) not more than 0.5 mm) ▪ More cooling
Cutting edge breaks out	▪ Wedge angle too small (heat build-up) ▪ Abrasive cracks due to incorrect cooling ▪ Too much play in the spindle bearing (vibrations occur)	▪ Select a larger wedge angle ▪ ▪ Uniform cooling ▪ Adjust play in the spindle bearing. Replace tapered roller bearing if necessary.
Turned thread is wrong	▪ Thread chisel is incorrectly clamped or incorrectly ground ▪ Incorrect thread pitch ▪ Incorrect diameter	▪ Set lathe tool to centre ▪ Grinding angles correctly ▪ Set the correct gradient ▪ Pre-turn workpiece to exact diameter

25 DIGITAL POSITION INDICATOR (DITRON DL50 SERIES)

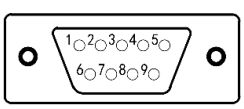
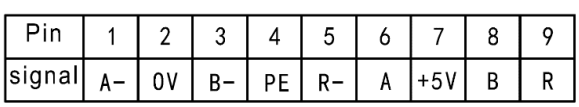
25.1 Indicating and Operating Elements



ED400FDDIG			
a	Readout x-axis (mm)	**g**	Left arrow key
b	Readout y-axis (mm)	**h**	Down arrow key
c*	Readout z-axis (mm)	**i**	Up arrow key
D	Zeroing, data recovery z-axis	**j**	Zeroing, data recovery x-axis
E	Menu call-, enter button	**k**	Zeroing, data recovery y-axis
f	Right arrow key		

*) nur 3-Achs-DRO | 3-axis DRO only

25.2 Technische Daten / Technical Data

Parameter / parameters	ED400FDDIG
Betriebsspannung (Frequenz) / supply voltage (frequency)	80–260 V (50–60 Hz)
Leistung / power	5 W
Einsatz-Temperatur / operating temperature	-10°–60° C
Lager-Temperatur / storage temperature	-30°–70°C
Relative Feuchte / relative humidity	<90 % (25)>
Bildschirmgröße / screen dimensions	3.5”
Achsen, die angezeigt werden / axis to be displayed	1 Achse, 2 Achsen, 3 Achsen
zulässiges Eingangssignal / input signal allowed by the DRO	RS422/TTL
zulässige Eingangssignalfrequenz / allowable input signal frequency	< 2 MHz
Längenauflösung / lenth resolution	0.1 µm, 0.2 µm, 0.5 µum, 1 µm, 2 µm, 2.5 µm, 5 µm und/and 10 µm
minimale Auflösung der Winkelanzeige / minimum resolution of angle display	0.0001/pulse
Gewicht / weight	0.4 kg
Größe / size	160 x 105 x 67 mm
Definition der 9-poligen Schnittstelle / interface definition of the grating ruler (DB 9-pins socket) 	

Pin	1	2	3	4	5	6	7	8	9
signal	A-	0V	B-	PE	R-	A	+5V	B	R

25.3 Basic Functions

25.3.1 Zeroing, Data Recvovery

c) Zeroing the displayed value of a coordinate

Press X/⊃, to reset the display value of the X axis to zero.

Press Y/Z0, to reset the display value of the Y axis to zero.

Press Z/Z1, to reset the display value of the Z axis to zero.

d) Recovering accidentally zeroed data

Press X/⊃, to reset the display value of the X axis to zero.

Press Y/Z0, to reset the display value of the Y axis to zero.

Press Z/Z1, to reset the display value of the Z axis to zero.

25.3.2 ABS/INC Mode

The position indicator provides two sets of standard coordinate display values, namely ABS (absolute) and INC (relative) coordinates.

The operator could store the reference zero point of the workpiece at ABS coordinate, and convert the ABS coordinate to the INC coordinate for machining.

Zeroing at any position on INC coordinate won't affect the length value relative to the reference zero point of the workpiece at ABS coordinate, which shall be stored during the entire machining process and could be checked whenever necessary.

Press ← or →, to change from one mode to another.

25.3.3 Coordinate Inputting

This operation allows the operator to set the current position to any value.

In ABS mode press X/⊃ until the figures start flashing to start entering coordinates for the X axis.

Set the desired value by pressing R/D and Z0↔Z1.

Press ← or → to switch to the previous/next digit.

After setting the desired values , press to exit the menu.MENU ENT.

In ABS mode press Y/Z0 until the figures start flashing to start entering coordinates for the Y axis.

In ABS mode press Z/Z1 until the figures start flashing to start entering coordinates for the Z axis.

25.3.4 1/2 function

The DRO provides an automatic centring function which divides the currently displayed position by 2 and sets the zero point at the centre of the workpiece.

To call the function, first press R/D and than the key of the coordinate whose value you want to half.

For example, to halve the value of the X-axis, press R/D an than press X/⊃

To half the value of the Y-axis, press R/D and than Y/Z0.

To half the value of the Z-axis, press R/D and than Z/Z1.

25.3.5 Diameter/Radius Conversion

To switch to the diameter display on the X axis, press R/D and than Z0÷Z1. At the same time, the color of the LED of the X axis lights continuously.

Press R/D and Z0÷Z1 again to return to the radius display. The LED will go out.

To switch between the diameter and radius of the Y and Z axes, proceed in the analogous way.

25.3.6 Y+Z function (applicable for 3-axis lathes only)

If the display is used on a 3-axis lathe, the values of Y and Z can be combined. The combined value is displayed on the Y axis.

To display the combined value of the Y and Z axes on the Y axis, press Z0÷Z1, at the same time the column color changes from Y and Z to red.

If you press Z0÷Z1 again, the red color disappears and the values of both axes are displayed normally again.

25.3.7 Memory Function

In the event of a sudden power failure during the machining process, the display has a data backup module that stores the coordinates and data before switching off. When the display is turned on again, the data is automatically restored.

25.3.8 Linear Error Compensation

This function is used to correct the system errors of the grating ruler measurement system. The calculation formula for the correction coefficient is as follows:

Correction coefficient S = (L - L1) / (L/1000) mm/m

L … actual measured length

L1 … Value displayed on the position indicator (mm)

S … Correction coefficient in mm/m (+ indicated extension / - indicated shortening)

Compensation range: ± 1.9 mm/m

Example:

The actual length of the X-axis table of the machine is 1000,000 mm and the value displayed on the display is 999,880 mm. The correction coefficient is calculated as follows:

Correction coefficient S = (1000.000 - 999.880) / (1000/1000) = 0.120 mm/m

Steps for linear compensation:

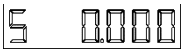
Under counting mode, press MENU ENT, to enter linear compensation.

Press X/⊃ to enter the X axis correction.

Press the arrow keys R/D Z0÷Z1 ← → to set the desired compensation value.

After setting, again press MENU ENT, to save the error compensation and exit the function.

For error compensation of the Y and Z axes, proceed in the same way.

Linear compensation interface: 

Note: If the displayed value is input, the DRO cannot enter the linear compensation function. First zero the corresponding value, then enter this function.

25.4 System Parameter Setting

The power switch is located on the back of the display. The display returns to self-test after power-up, which includes checking whether the LED display is normal and whether the system resolution and model settings match.

The self-monitoring state continues until the display changes to the normal display state.

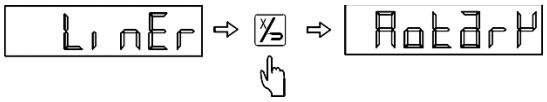
If you press MENU ENT once during the self-test process, the display changes to the state for setting the system parameters.

There you can make the following system parameter settings:

1. Selection of encoder type (linear or rotary encoder)
2. Set the resolution (fixed resolution selection: 0.1 um, 0.2 um, 0.5 m, 1 um, 2 um), 2.5 um, 5 um and 10 um).
3. Setting the counting direction (0: positive direction, 1: negative direction)
4. Setting the compensation mode (linear or non-linear compensation)
5. Set the rotary encoder parameter
6. Select display type

25.4.1 Encoder Type Selection

LINER stands for a linear displacement transducer that matches the axis: ROTARY stands for a rotary encoder that matches the axis.



Press X/⊃ to alter the encoder type of X axis.

Press Y/Z0 to alter the encoder type of Y axis.

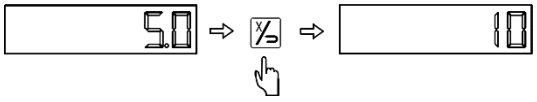
Press Z/Z1 to alter the encoder type of Z axis.

Press ➡ to enter step 2 and press MENU ENT to save and exit parameter setting.

25.4.2 Resolution Setting

For a linear encoder, set the resolution as follows:

1. Select resolution (0.1 um, 0.2 um, 0.5 m, 1 um, 2 um, 2.5 um, 5 um, 10 um)
2. Press X/⊃ to alter the resolution of X axis, press Y/Z0 to alter the resolution of Y axis or press Z/Z1, to alter the resolution of Z axis.



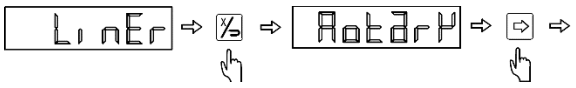
For encoders, enter the system parameter setting and select encoders. The information screen shows the L\R type and the X axis shows Rotary. Then press ➡ to enter the resolution setting of the encoder when the information screen displays XYZ-Res.

The resolution varies depending on the encoder type, so you must enter the resolution for the corresponding encoder type.

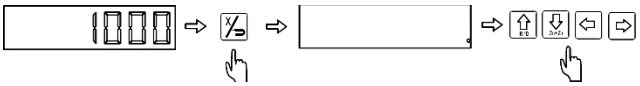
When entering the resolution, a negative value gives the counting mode in degrees/minutes/seconds (DMS) and a positive value gives the counting mode in degrees (D).

The display supports a maximum resolution of 99999.

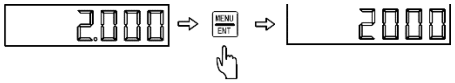
Example: Set the encoder resolution to 1000 P/R:



Linear Scale Rotary encoder



Display the resolution of rotary encoder Input the resolution of rotary encoder



After entering the resolution of the encoder, press MENU ENT to save. Y- and Z-axis are set in the same way as the X-axis.

25.4.3 Counting Direction Selection

The counting direction can be selected in the positive or negative direction (0 in the left window indicates the positive counting direction of the window, 1 in the left window indicates the negative counting direction of the window.)

To change the counting direction of the X axis, press X/⊃.

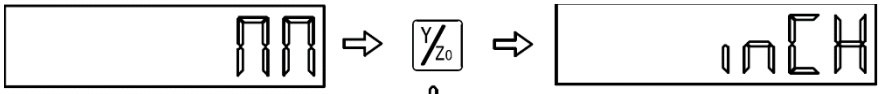
To change the counting direction of the Y axis, press Y/Z0.

To change the counting direction of the Z axis, press Z/Z1.

Press ➡ to go to "Inch and Metric Settings", press MENU ENT to save and exit the parameter setting.

25.4.4 Inch and Metric Conversion

When entering the Inch and Metric settings, press MENU ENT to select. Setting way will be as follows:



mm inch

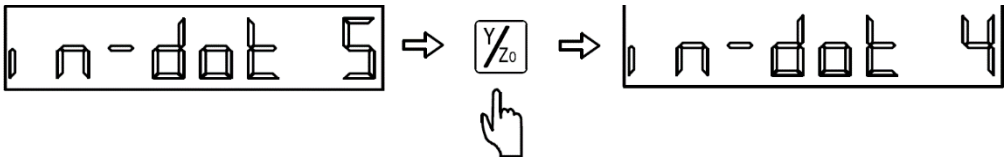
After having made the desired setting, press MENU ENT again, to enter the DRO mode setting.

If you have selected "Metric", now press ➡ to enter the DRO mode setting.

If you have selected „Inch" press ➡ to enter the decimal point setting.

25.4.5 Decimal Point Setting Under Inch

When the DRO is in inch mode, it supports 4 or 5 decimals. The factory setting is 5 decimals. Setting can be changed. Setting way will be as follows:

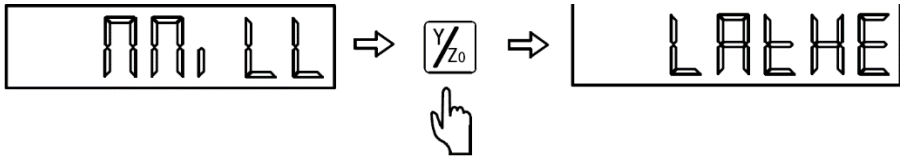


5 decimals under inch 4 decimals under inch

After having made the settings, press MENU ENT to save and exit, then press ➡ to enter the DRO mode setting.

25.4.6 DRO mode setting

Mode setting way will be as follows:

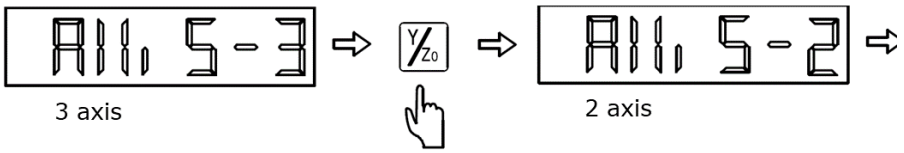


Mill Mode		Lathe Mode

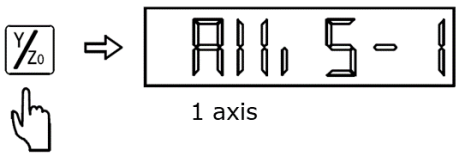
Once you have set the DRO mode, press MENU ENT to save and exit, and then press ➡ to enter the axis number setting.

25.4.7 Axis Number Setting

Users may turn on or off 1 or 2 of the axis. The setting way will be as follows:



3 axis 2 axis



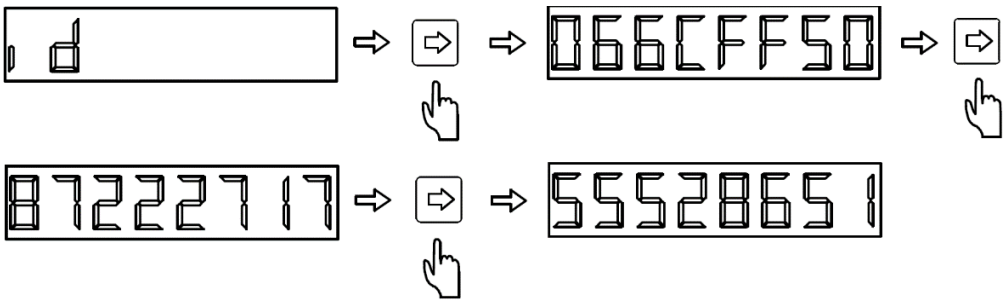
1 axis

This function is unavailable for single axis DRO.

After having set press MENU ENT to save and exit, then press ➡ to check the ID of the DRO.

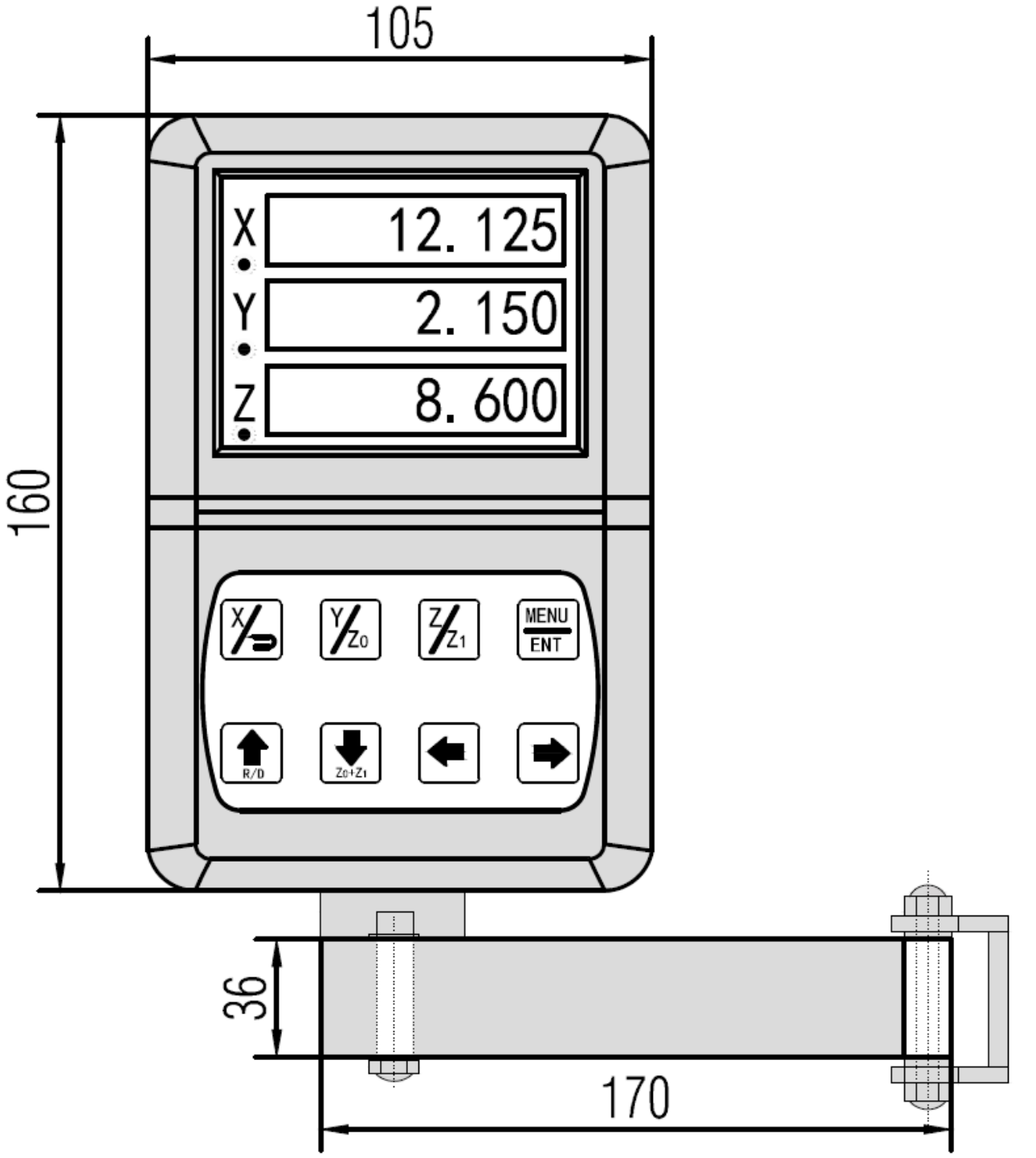
25.4.8 Checking the ID of the DRO

Every set of DL50 has ist own ID. The ID consists of 24 digits. To check the ID proceed as shown in the below illustration:

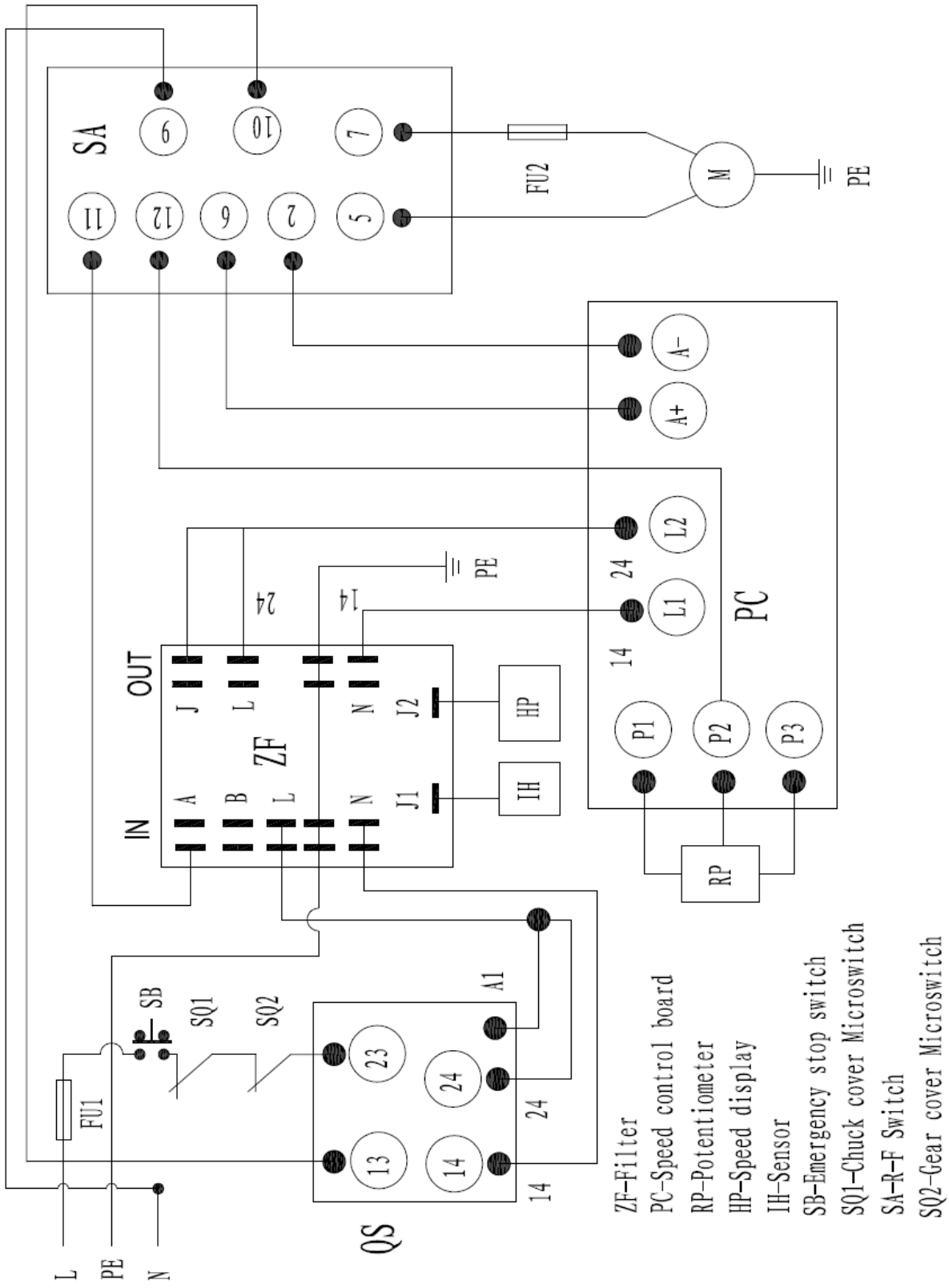


When the DRO is single axis, the ID will be displayed on the X axis. It will be displayed on Y axis for 2 axis DROs which need to press ➡ to check the complete ID. Press Z0-Z1 to get back. It will be displayed on X, Y and Z axis for 3 axis DROs. After having checked the ID press MENU ENT to exit the system menu.

59 MONTAGEZEICHNUNG POSITIONSANZEIGE / ASSEMBLY DRAWING POSITION INDICATOR / ESQUEMA DE MONTAJE DEL INDICADOR DE POSICIÓN / INDICATEUR DE POSITION DU DESSIN D'ASSEMBLAGE / INDICATORE DI POSIZIONE DEL DISEGNO DI MONTAGGIO



60 SCHALTPLAN / WIRING DIAGRAM / DIAGRAMA DE CABLEADO / SCHÉMA ÉLECTRIQUE / SCHEMA ELETTRICO



61 ERSATZTEILE / SPARE PARTS / PIEZAS DE RECAMBIO / PIÈCES DE RECHANGE / PARTI DI RICAMBIO

61.1 Ersatzteilbestellung / Spare Parts Order / Pedido de piezas / Commande de pièces détachées / Ordinazione delle parti di ricambio

(DE) Mit Holzmann-Ersatzteilen verwenden Sie Ersatzteile, die ideal auf Ihre Maschine abgestimmt sind. Die optimale Passgenauigkeit der Teile verkürzt die Einbauzeit und verlängert die Lebensdauer der Maschine.

HINWEIS

Der Einbau von anderen als Originalersatzteilen führt zum Verlust der Garantie! Daher gilt: Beim Tausch von Komponenten/Teilen nur vom Hersteller empfohlene Ersatzteile verwenden.

Beim Bestellen von Ersatzteilen verwenden Sie bitte das Serviceformular, das Sie am Ende dieser Anleitung finden. Geben Sie stets Maschinentype, Ersatzteilnummer sowie Bezeichnung an. Um Missverständnissen vorzubeugen, empfehlen wir mit der Ersatzteilbestellung eine Kopie der Ersatzteilzeichnung beizulegen, auf der die benötigten Ersatzteile eindeutig markiert sind. **Oder nutzen sie die Online-Bestellmöglichkeit über den Ersatzteilkatalog bzw. Ersatzteilanforderungsformular auf unserer Homepage**

Bestelladresse sehen Sie unter Kundendienstadressen im Vorwort dieser Dokumentation.

(EN) With Holzmann spare parts, you use spare parts that are ideally matched to your machine. The optimum fitting accuracy of the parts shortens the installation time and extends the service life of the machine.

NOTICE

The installation of parts other than original spare parts leads to the loss of the guarantee! Therefore: When replacing components/parts, only use spare parts recommended by the manufacturer.

When you place a spare parts order please use the service formula you can find in the last chapter of this manual. Always take a note of the machine type, spare parts number and part name. We recommend to copy the spare parts diagram and mark the spare part you need. **Or use the electronic ordering opportunity via the spare parts catalogue or spare parts request form on our homepage**

You find the order address in the preface of this operation manual.

(ES) Con las piezas de recambio de Holzmann, utiliza piezas de recambio que se adaptan perfectamente a su máquina. El ajuste óptimo de los componentes acorta el tiempo de instalación y aumenta la vida útil de la máquina.

AVISO

¡La instalación de piezas de recambio no originales lleva a la pérdida de garantía! Por lo tanto: Al llevar a cabo la sustitución de componentes/piezas, utilice únicamente piezas de recambio recomendadas por el fabricante.

Para pedir piezas de recambio utilice el formulario del servicio de atención al cliente que encontrará al final del presente manual. Indique siempre el tipo de máquina, la referencia de la pieza de recambio y la denominación. Para evitar malentendidos, se recomienda adjuntar al pedido una copia del esquema de piezas de recambio en el que se marque claramente las piezas de recambio necesarias. **O utilice la opción de pedido online a través del catálogo de piezas de recambio o del formulario de solicitud de piezas de recambio que encontrará en nuestra página web**

Encontrará la dirección de pedidos en las direcciones del servicio postventa que se encuentra en el prólogo de esta documentación.

(FR) Avec les pièces de rechange Holzmann, vous utilisez des pièces de rechange qui conviennent parfaitement à votre machine. La précision d'ajustage optimale des pièces réduit le temp de pose et augmente la durée de vie de la machine.

AVIS

Le montage de pièces autres que les pièces de rechange d'origine entraîne la perte de la garantie ! Par conséquent, la règle est la suivante : Utiliser uniquement des pièces de rechange recommandées par le fabricant pour le remplacement des composants/pièces.

Pour commander des pièces détachées, s'il vous plaît utiliser le formulaire de service qui est la fin de ce manuel. Toujours entrer le type de machine et le numéro de la pièce de rechange et le nom de la pièce. Pour éviter les malentendus, il est recommandé une copie du schéma de vue explosé dans lequel vous marquez clairement les pièces de rechange nécessaires.

Vous trouverez notre adresse sur la préface de ce manuel

(IT) Con le parti di ricambio Holzmann utilizzate pezzi di ricambio che combaciano e sono adatti tra loro. L'esattezza di adattamento ottimale dei pezzi accorcia i tempi di montaggio e mantiene la durata di vita della macchina.

NOTA

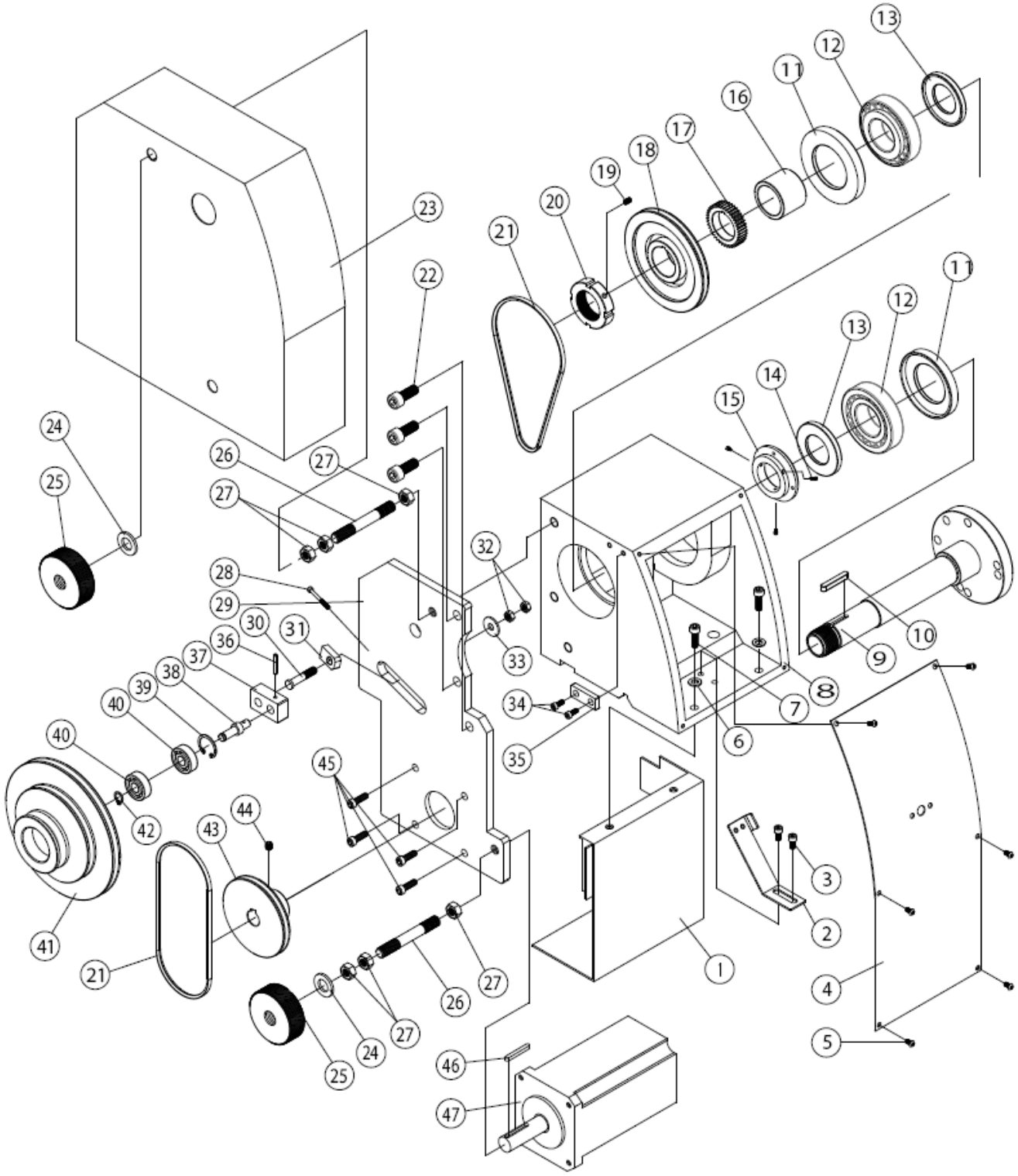
Il montaggio di altre parti di ricambio diverse da quelle originali causa la perdita della garanzia! Pertanto vale la regola: Quando si sostituiscono componenti/pezzi usare solo parti di ricambio originali.

Per ordinare parti di ricambio usare il modulo dell'assistenza che trovate al termine di queste istruzioni. Indicare sempre il tipo di macchina, il numero di parte di ricambio e la denominazione. Per evitare incomprensioni, si raccomanda di allegare agli ordini di parti di ricambio una copia del disegno delle parti di ricambio, su cui sono contrassegnate le parti di ricambio richieste. **Oppure utilizzate l'opzione di ordinazione online tramite il catalogo ricambi o il modulo di richiesta ricambi sulla nostra homepage**

L'indirizzo per gli ordini si trova sotto gli indirizzi dei centri di assistenza clienti nella prefazione di questa documentazione.

61.2 Explosionszeichnung / explosion drawing / Vista de despiece / Vue éclatée / Disegno esploso

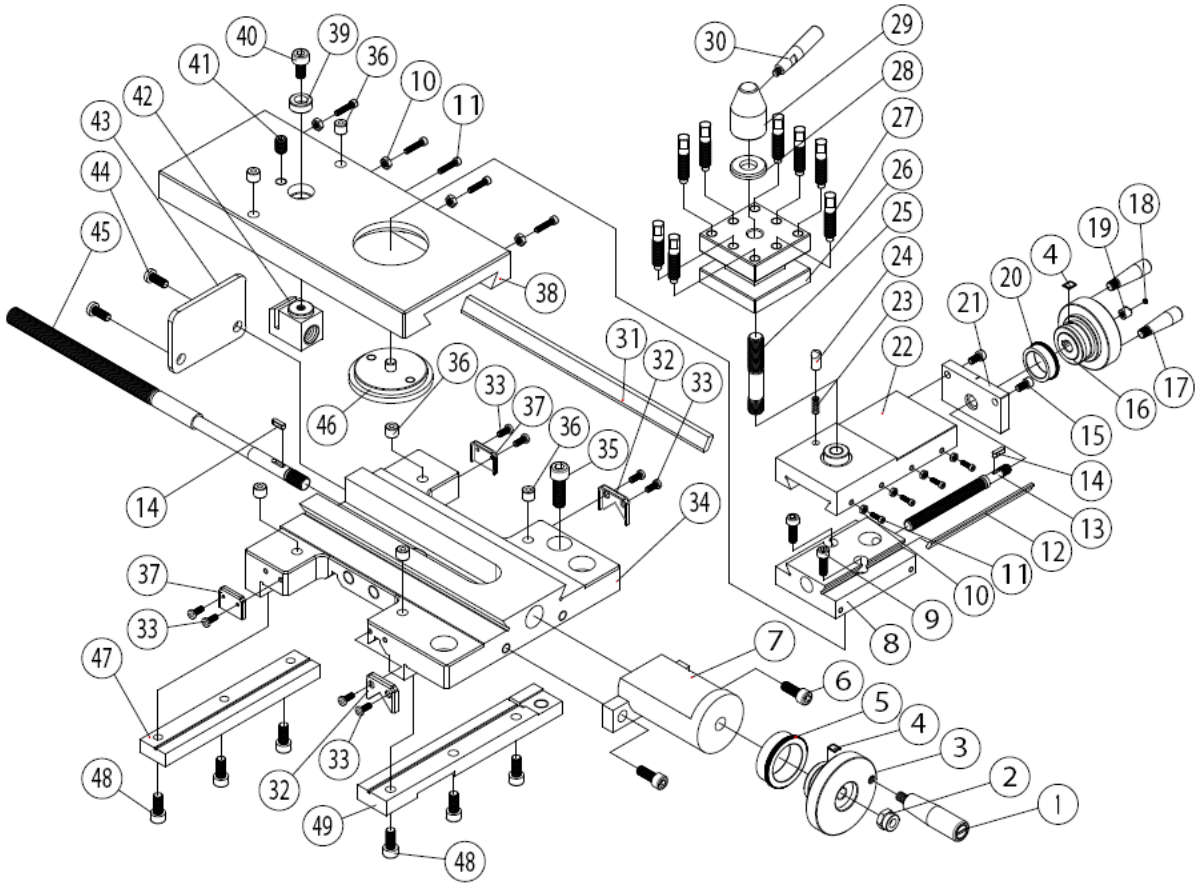
HEADSTOCK ASSEMBLY



Nr.	Name	Qty.	Nr.	Name	Qty.
1	cover	1	**25**	thin nut	2
2	sensor rack	1	**26**	bolt	2

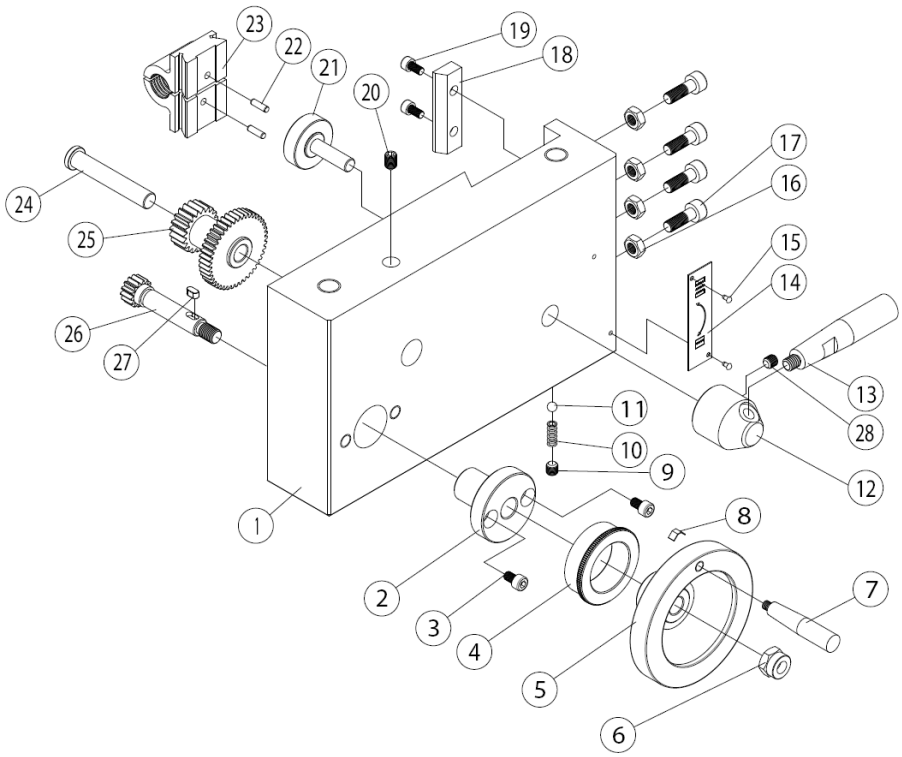
3	screw	2	**27**	nut	6
4	main plate	1	**28**	screw	1
5	screw	6	**29**	bracket plate	1
6	washer5	2	**30**	bolt	1
6	screw	2	**31**	block	1
7	spindle box	1	**32**	screw	2
9	spindle	1	**33**	washer8	1
10	key	1	**34**	screw	2
11	cover	2	**35**	block	1
12	bearing	2	**36**	pin	1
13	cover	2	**37**	block	1
14	screw	3	**38**	bolt	1
15	speed ring	1	**39**	spring ring22	1
16	bush	1	**40**	bearing	2
17	gear	1	**41**	pulley	1
18	spindle puller	1	**42**	spring ring8	1
19	lock screw	1	**43**	motor puller	1
20	nut	1	**44**	lock screw	1
21	belt	2	**45**	screw	4
22	screw	3	**46**	key	1
23	rear cover	1	**47**	motor	1
24	washer10	2			

CROSS SLIDE ASSEMBLY



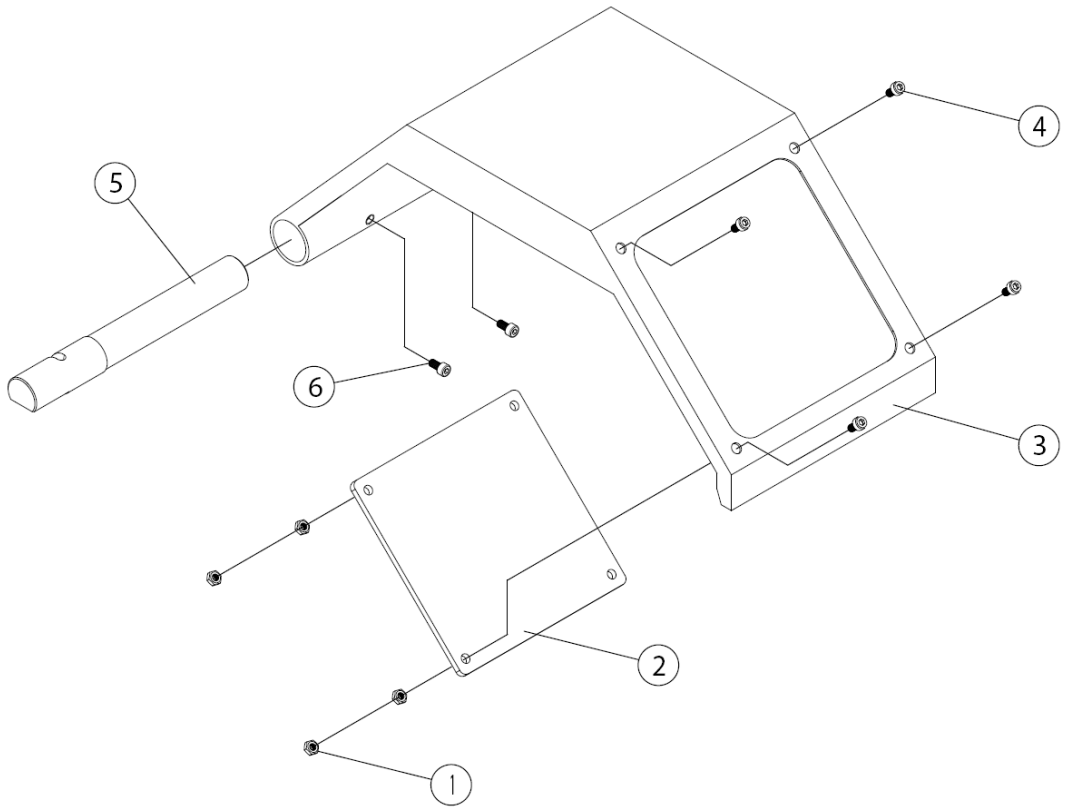
Nr.	Name	Qty.	Nr.	Name	Qty.
1	handle	1	**26**	rack	1
2	lock nut A grade	1	**27**	lock screw	8
3	handle base	1	**28**	washer	1
4	spring	2	**29**	handle base	1
5	collar	1	**30**	handle	1
6	screw	2	**31**	gib	1
7	bracket	1	**32**	wiper	2
8	cross slide3 base	1	**33**	screw	8
9	screw	2	**34**	cross slide1	1
10	nut	8	**35**	screw	1
11	screw	9	**36**	oilcup6	6
12	gib	1	**37**	wiper	2
13	lead screw	1	**38**	cross slide2	1
14	key	2	**39**	bush	1
15	screw	2	**40**	screw	1
16	handwheel	1	**41**	lock screw	1
17	handle	2	**42**	nut	1
18	lock screw	1	**43**	limit baffle	1
19	lock nut	1	**44**	screw	2
20	collar	1	**45**	lead screw	1
21	bracket	1	**46**	micrometer pan	1
22	cross slide3	1	**47**	sliding block	1
23	spring	1	**48**	screw	6
24	pin	1	**49**	rear pressure plate	1
25	bolt	1			

SADDLE ASSEMBLY



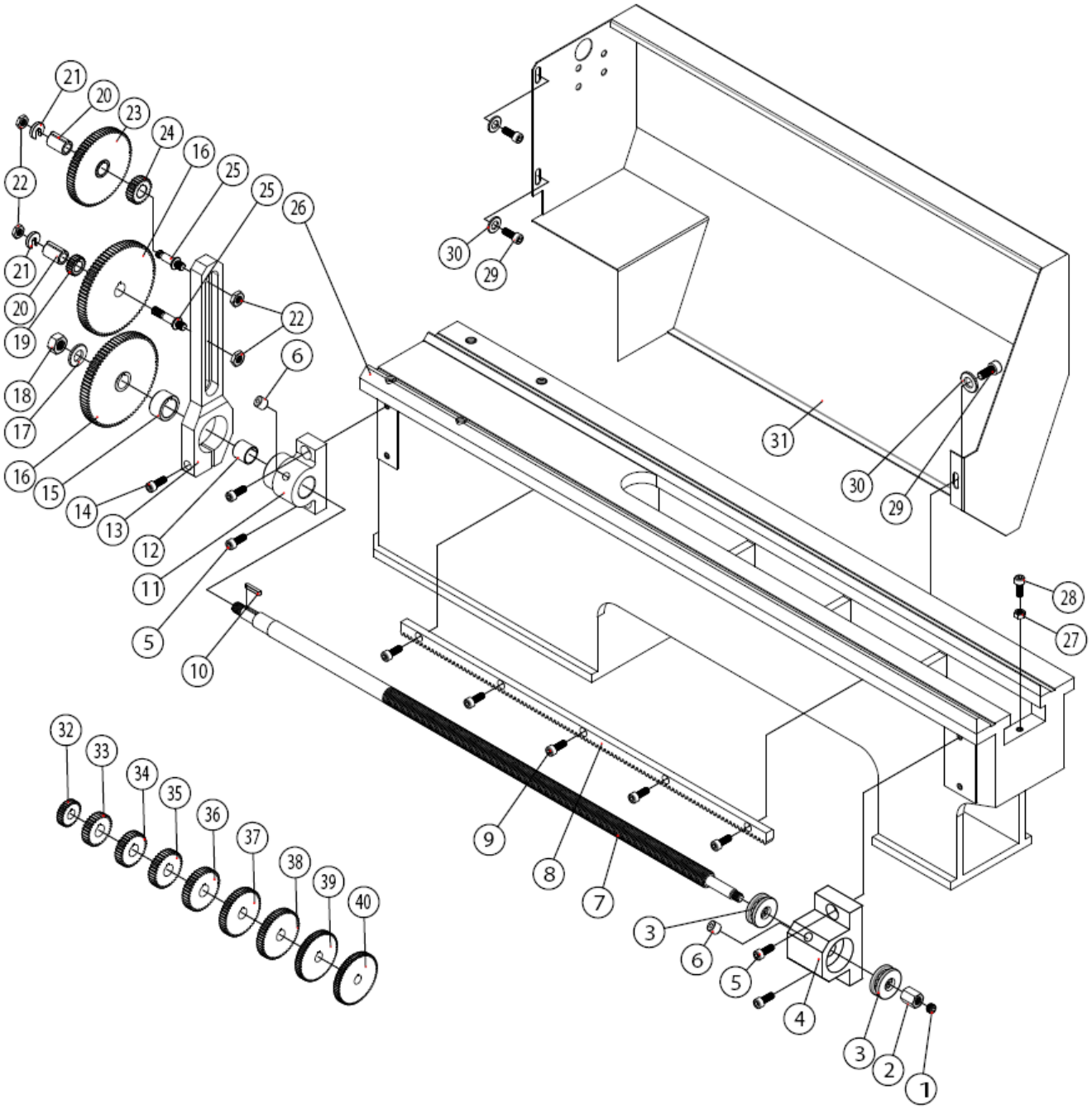
Nr.	Name	Qty.	Nr.	Name	Qty.
1	apron	1	**15**	plate rivet	2
2	bracket	1	**16**	nut	4
3	screw	2	**17**	screw	4
4	collar	1	**18**	gib	1
5	handwheel	1	**19**	screw	2
6	lock nut	1	**20**	lock screw	1
7	handle	1	**21**	plate	1
8	spring	1	**22**	pin	2
9	lock screw	1	**23**	half nut	1
10	spring	1	**24**	shaft	1
11	ball5	1	**25**	gear	1
12	hand base	1	**26**	gear shaft	1
13	handle	1	**27**	key	1
14	nut plate	1	**28**	lock screw	1

CHUCK SHIELD ASSEMBLY



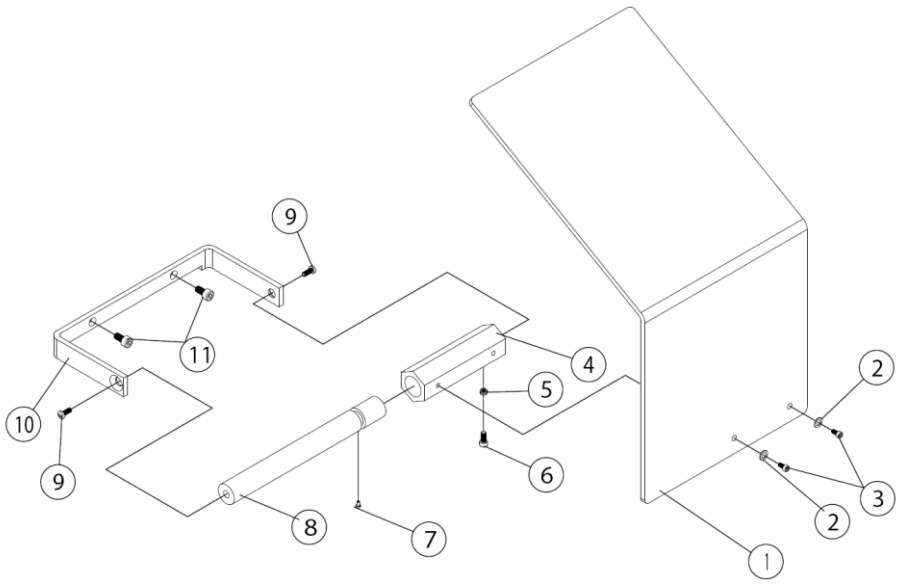
Nr.	Name	Qty.	Nr.	Name	Qty.
1	nut	4	**4**	screw	4
2	Perspective glass	1	**5**	safety shaft	1
3	chuck cover	1	**6**	screw	2

BED ASSEMBLY



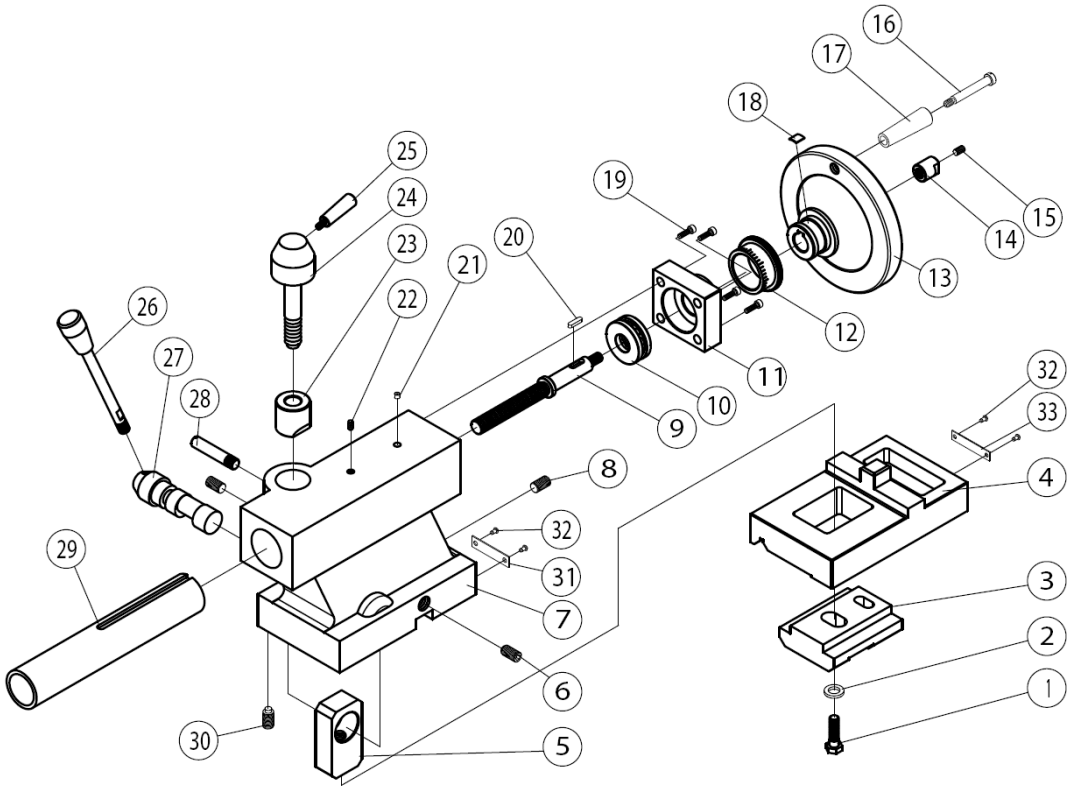
Nr.	Name	Qty.	Nr.	Name	Qty.
1	lockscrew	1	**21**	spring ring	2
2	custom nut	1	**22**	thin nut	4
3	bearing	2	**23**	gear	1
4	right support	1	**24**	gear	1
5	screw	4	**25**	bolt	2
6	oilcup6	2	**26**	bed	1
7	lead screw	1	**27**	nut	1
8	rack	1	**28**	screw	1
9	screw	5	**29**	screw	3
10	key	1	**30**	washer5	3
11	left support	1	**31**	rear Baffle	1
12	bearing	1	**32**	gear	1
13	frame	1	**33**	gear	1
14	screw	1	**34**	gear	1
15	bush	1	**35**	gear	1
16	gear	2	**36**	gear	1
17	washer10	1	**37**	gear	1
18	nut	1	**38**	gear	1
19	gear	1	**39**	gear	1
20	gear gleeve	2	**40**	gear	1

TURRET SHIELD ASSEMBLY



Nr.	Name	Qty.	Nr.	Name	Qty.
1	turret glass	1	**7**	plate rivet	1
2	flat washer 3	2	**8**	rack shaft	1
3	screw	2	**9**	screw	2
4	rotation shaft	1	**10**	rack	1
5	nut	1	**11**	screw	2
6	screw	1			

TAILSTOCK ASSEMBLY



Nr.	Name	Qty.	Nr.	Name	Qty.
1	hexagon bolt	1	**18**	spring	1
2	flat gasket 8	1	**19**	screw	4
3	binder plate	1	**20**	key	1
4	backplane	1	**21**	oil cup6	1
5	lock hanging piece	1	**22**	nut	1
6	screw	2	**23**	lock base	1
7	tailstock	1	**24**	lock screw	1
8	screw	1	**25**	handle	1
9	lead screw	1	**26**	long handle pole	1
10	bearing	1	**27**	electronic shaft lock	1
11	housing	1	**28**	limit screw	1
12	collar	1	**29**	sleeve	1
13	handwheel	1	**30**	screw	1
14	locknut	1	**31**	plate	1
15	handle	1	**32**	plate screw	4
16	handle shaft	1	**33**	plate	1
17	handle sleeve	1			