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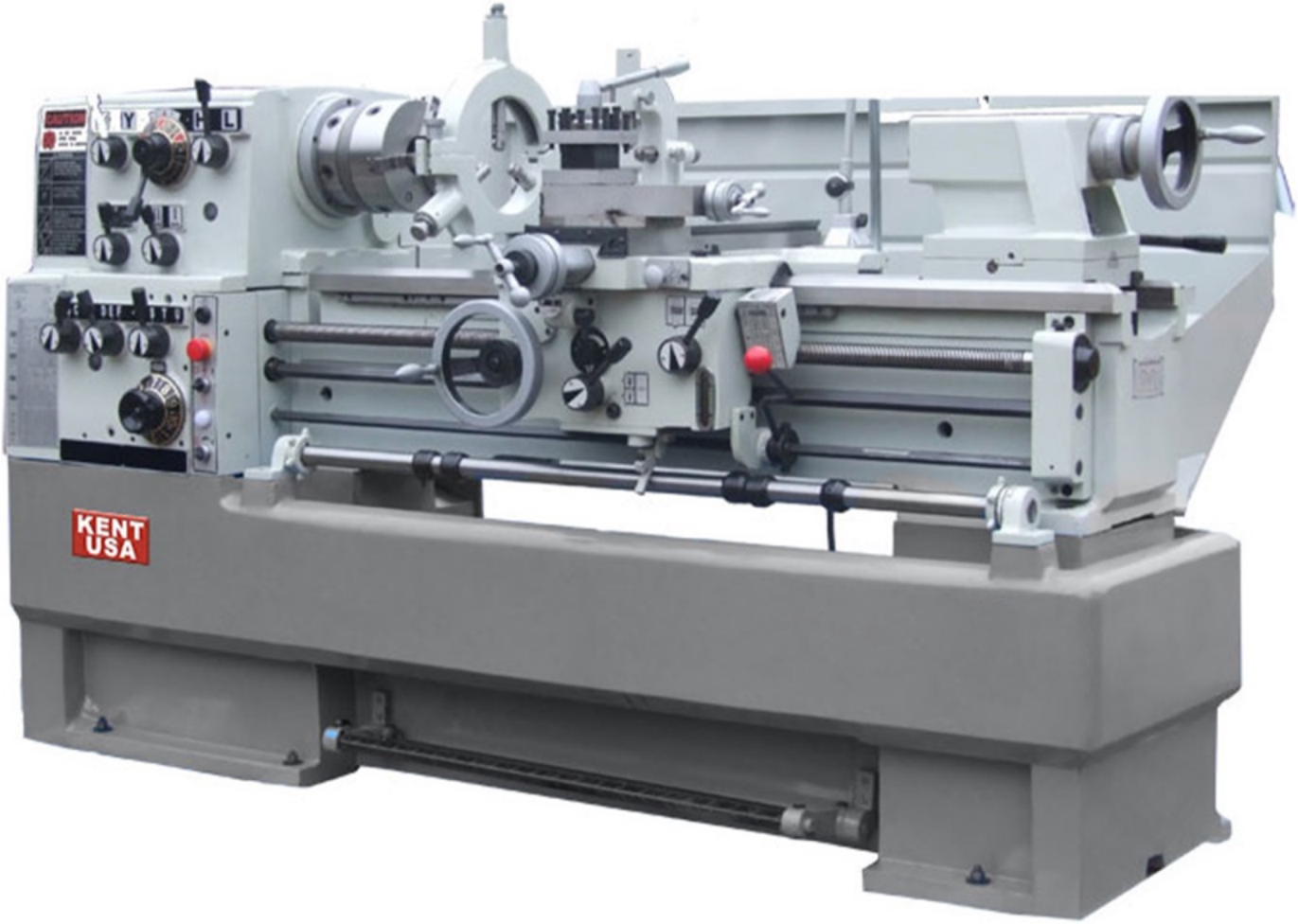
Since 1979

KLS-1860G
Manual Economy Lathe
Operation Manual



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Caution

Be sure to read this manual before operating the machine.

（1） Do not operate without wearing safety shoes and safety glasses.

（2） Keep hands out of moving parts of this machine.

（3） Disconnect power before servicing.

（4） Be sure the key is removed from the chuck and the workpiece is completely gripped before rotating the spindle.

Preface

This manual contains concise information on the transportation, installation, set up, operation, maintenance and troubleshooting of your machine. Prior to installation and operation, carefully read this manual so as to be familiar with this machine.

1) All standard shop/machine operating safety procedures must be observed when the machine is in operation.
2) Lubricate the machine according to the instructions of this manual. Use only recommended (or approved equivalent) lubricating oils and greases.
3) Machine should be thoroughly cleaned and oiled after each use.
4) Keep machine clean while operating. Remove chip build-ups so that machine operates free and easy at all times.
5) Check all machine guide ways for minor damage caused by removing (oil-stone) any burrs or swags (from dents), which might hinder the smooth operation of the machine.

Table of Contents

1 Machine specifications and features

1.1 Machine basic specifications

Items	KLS-1860G KLS-1640A KLS-1640GD	KLS-1840G KLS-1840A KLS-1840GD KLS/B	KLS
Max. swing over bed mm	Φ410(16″)	Φ458 (18″)	Φ510(20″)
Max. swing over cross slide mm	Φ240(9 7″/16)	Φ288(11 5″/16)	Φ305(12″)
Max. swing in gap mm	Φ595(23 7″/16)	Φ640(25 3″/16)	Φ745(29 5″/8)
Available length in gap mm	155 (6 1″/8)		320(12 9″/16)
Max. distance between centers mm	750/1000/1500 (30″/40″/60″)		1500/2000(60″/80″)
Max. machining length mm	650/900/1400(26″/35″/55″)		1400/1900(55″/75″)
Max. machining length (with taper attachment) mm	530/780/1280(20″/30″/50″)		1280/1780(50″/70″)
Center height	1085(42 3″/4)	1110(43 3″/4)	1150(45 1″/4)
Spindle bore mm	Φ52(2 1″/16)	KLS/B: Φ77(3″)	Φ82(3 1″/4)
Spindle nose	ISO702/ II No.6 cam lock type; KLS/B;KLS:ISO702/ II No.8 cam lock type		
Spindle taper	Morse No.6; KLS-1800D/B; KLS: Φ90mm 1:20 (3 35″/64, 1:20)		
Spindle speeds r/min	KLS-1860: 8 8-step; KLS-1860A: 16 12-step; KLS 6 40GD: 12-step; KLS/KLS:12-step		
Travel distance of compound rest mm	120(4 3″/4)		200(7 7″/8)
Travel distance of cross slide mm	230(9″)		315(12 7″/16)
Longitudinal leadscrew pitch mm	4TPI or 6		
Max. section of cutting tool mm×mm	25×25(1″ ×1″)		
Longitudinal leadscrew pitch	40 kinds, 0.0012″ ~0.0352″ /r		50 kinds
Cross feeds half longitudinal values.			50 kinds
Pitch type and range			
Metric threads	53 kinds 0.4~14		24 kinds
Inch threads	40 kinds 2~56TPI		50 kinds

Items	KLS-1860 KLS-1640A KLS-1640GD	KLS-1840G KLS-1840A KLS-1840GD KLS/B	KLS
Diametral pitch threads	32 kinds 4～56D.P		50 kinds
Module pitch threads	44 kinds 0.4～7M.P		34 kinds
Diameter of tailstock quill mm	φ55(2 1″/8)		φ75(2 15″/16)
Travel distance of tailstock quill mm	120(4 3″/4)		180(7 5″/64)
Taper of tailstock quill	Morse No.4		Morse No.5
Main motor	Y112M-4.4kW; YD132M-8/4, 3kW/4.5kW		7.5kW
Coolant pump	40W or1/8HP		
Drive belts	B1803/b1778 3 pcs	B1828/b1803 3 pcs B1778(KLS/D)	B1956 3pcs
Overall dimensions and weights			
Specification: 750	1450kg	1500kg	
1000	1700kg	1750kg	
1500	1950kg	2000kg	2720kg
2000			2980kg

1.2 Main features

(1) High rigidity single-unit base with special exit for removing chips.

(2) Very solid compound rest with 4-way tool post for strong cutting.

(3) Quench hardened and precision ground gears and bed guide ways.

(4) Headstock change gears are driven by the spline shaft.

(5) Wide range of regulating speeds.

(6) Three-position supported spindle with a φ52 bore or φ77or φ82 bore.

(7) The pressure lubrication system filtrates automatically.

(8) High-grade cast iron bed.

(9) The lathe can cut Metric threads and Inch threads directly.

(10) Performing external cylindrical turning and end cutting becomes easy now, for it is not necessary to change the rotation of the feed rod (from longitudinal feed to transverse feed).

(11) The threading lever interlocks an automatic feed device mechanically so that to prevent

damage caused by simultaneous engagement.

(12) Super-heavy type tailstock quill has taper shank drive and drift slot.

(13) Electromagnetic contactor and over-load relay in the electrical niche, which can prevent motor from being over-loaded and ensure operation.

(14) A low voltage (110V) control circuit and a "zero voltage" protection relay.

(15) Set a fourth rod with four-position automatic feed stop device, which can disengage longitudinal feed at the preset (adjusted) position.

2 Installation

2.1 Handling

Caution: When handling, observe symbols painted on crate for "safe lifting" either by sling or fork. When crate has been removed, the machine can be handled either on or off the skid.

2.2 Lifting

（1） Use two steel bars 35mm (1 3″/8) diameter, 760mm (30″) (minimum) long. [should extend at least 100mm(4″) each side of the lathe. Place and steady bars then sling as shown in Fig.1.

（2） Use at least 1″/2 diameter steel cable (or equivalent fabric) sling for lifting. Place wooden blocks or used carbon between the sling and the machine to prevent damage.

（3） Before lifting, position the tailstock and carriage towards the tailstock end of the bed to help distribute and balance the machine weight.

（4） Handle the machine carefully to avoid any bumps or shocks. Place machine over six foundation bolts (previously located, see Fig.2).

Machine should be located allowing sufficient area for proper operation and maintenance (chip removal, etc.) .

Min.600mm(24″) from wall at back and tailstock end of machine.

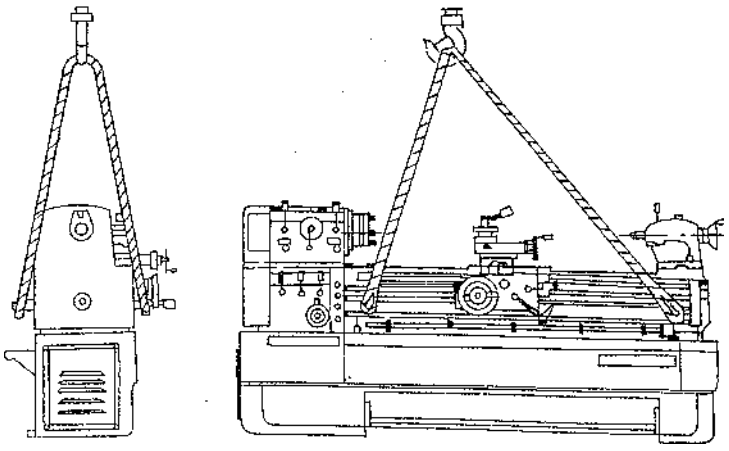
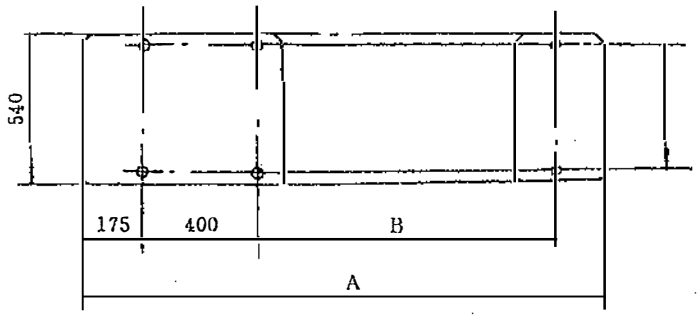
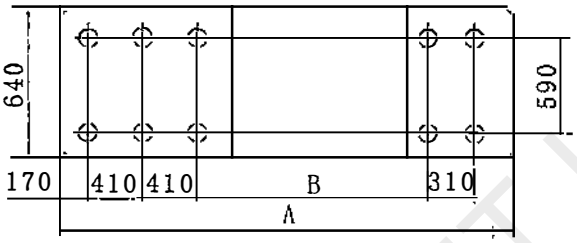


Fig.1 Machine Lifting



Item \ Model	750	1000	1500
A	1805	2055	2555
B	1080	1330	1830



(For KLS)

Item \ Model	1500	2000
A	2870	3370
B	1425	1925

(For KLS)

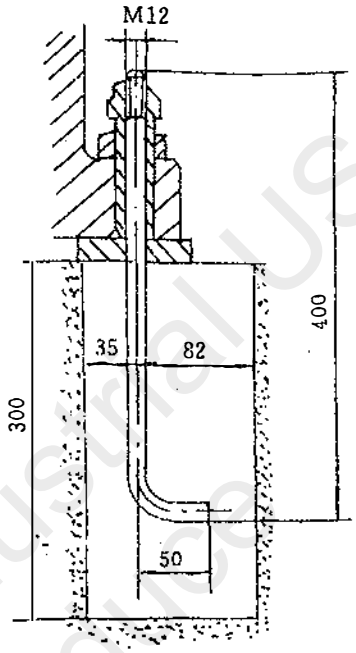


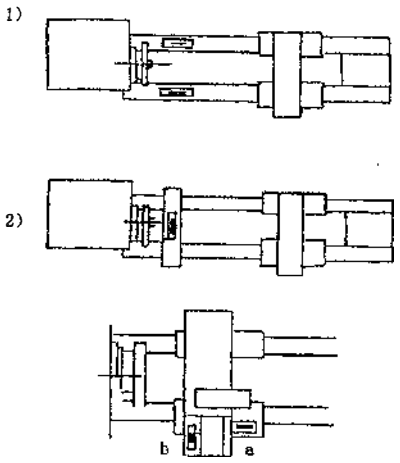
Fig.2 Installation Foundation

2.3 Cleaning

This machine is protected with a special anti-rust agent. Before operating the machine, clean all parts especially the leadscrew, rack, and all bright surfaces with soft brush/cloth soaked with cleaning solvent or kerosene. DON'T USE GASOLINE OR CELLULOSS SOLVENT! (to avoid danger or fire or explosion.) After the removal of anti-rust agent, keep the machine properly lubricated. Press the hand-push (one shot) pump several times to made sure ways are lubricated.

2.4 Level adjustment

Once the machine is located on the foundation bolts, a precision level should be used alternately on the cross slide and guide ways of the lathe as illustrated (Fig.3). Minute adjustments of adjusting bolts should be made until the machine is accurately leveled.



1) Bed-level---longitudinal direction

When using precision level moving along the bed slideways, the maximum reading should be within 0.04/1000.

2) Bed-level---transverse direction

When using precision level moving along the cross slide, all readings should be within 0.04/1000.

Fig. 3 Level Adjustment

2.5 Power supply (wiring/ connecting)

Caution: ALL WIRING AND ELECTRICAL CONNECTING OF THE MACHINE MUST BE DONE BY A QUALIFIED ELECTRICIAN.

（1）Refer to wiring schematic. (See Electrical Equipment Connection Diagrams on page 30 or page 33.)

（2）Use proper wire (heavy enough wire gage to carry Max. load).

（3）Correctly ground the machine.

（4）Be sure that power source is not far from the machine and that the cable is not over-loaded.

Note: Full-load starting current value of the motor greatly exceeds the normal running current value.

3 Cooling system

The coolant of the machine is stored in the right section of the machine base. Providing coolant by the electrical pump, the flow of coolant is controlled by ball valve mounted on the coolant pipe.

4 Lubrication system

4.1 Lubrication check

Lubrication location	Method	Frequency	Qty.	Oil recommended	Remarks
Headstock	Fill: Remove end cover and take off the oil inlet plug, fill to oil sight glass in the middle level. Drain: Take off the drain plug (on the right side bottom of headstock).	First change: after approx 200 hours. Thereafter, every six months.	6 liters (1 1/2Gal.)	Shell Tellus22#	
Feed gear box	Add/Fill: Remove the upper cover and the covering plate, fill to the center level of the oil sight glass. Drain: take off the drain plug on the front side bottom of the feed gear box.	Add: as needed to always keep oil sight glass "central level". Drain/change: every six months.	Approx. 5liters. (1 1/4Gal.)	Tellus68#	
Apron	Add/Fill: Take off the inlet cap (either at the left end side of R.H. apron handwheel or at the right end side of L.H. apron handwheel), fill to the center level of the oil sight glass.	Add: as needed to always keep oil sight glass "central level". Drain/change: every six months.	Approx. 2 liters. (1/2Gal.)	Tellus68#	
Guideways, saddle and cross slide	1.Before operation, push"one-shot"pump (left side of left-hand apron handwheel, right side of right-hand apron handwheel) 2.Automatic lubrication while the carriage is moving.	3 times a day. (Normal operation)	1-3 shots in normal	Provided from apron reservoir	Flow controlled by means of "lube flow adjustor"
Compound rest, cross slide, feed screw and nut	Oil inlets: top surfaces on cross slide, compound rest and tool post clamp handle. Lubricate with pressure oil gun.	Once a day/ as needed	2-3 drops (one squirt of pressure oil gun)	Shell Tellus22#	
Tailstock	Oil inlets: top surfaces on tailstock. Lubricate with pressure oil gun.	Once a day/ as needed when in use	2-3 drops (one squirt of pressure oil gun)	Shell Tellus22#	
Outboard end gears	Apply grease to gear teeth	Check weekly and apply grease as required.	Thin coating (gears must not be run dry)	Use good clinging type gear grease	
Leadscrew, feed rod and half nut	Lubricate surface with brush or soft cloth dipped in oil. Oil cap on leadscrew bracket.	Once a day/ as needed	Leadscrew must be cleaned and threads lightly oiled.	Shell Tellus22#	
Other portions	Oil inlets: a.Handwheel shaft of apron b.Feed screw shaft of cross slide c.Feed screw shaft of compound rest d.Thread dial indicator.Lubricate with pressure oil gun.	Once a day/ as needed		Shell Tellus22#	

4.2 Lubrication chart

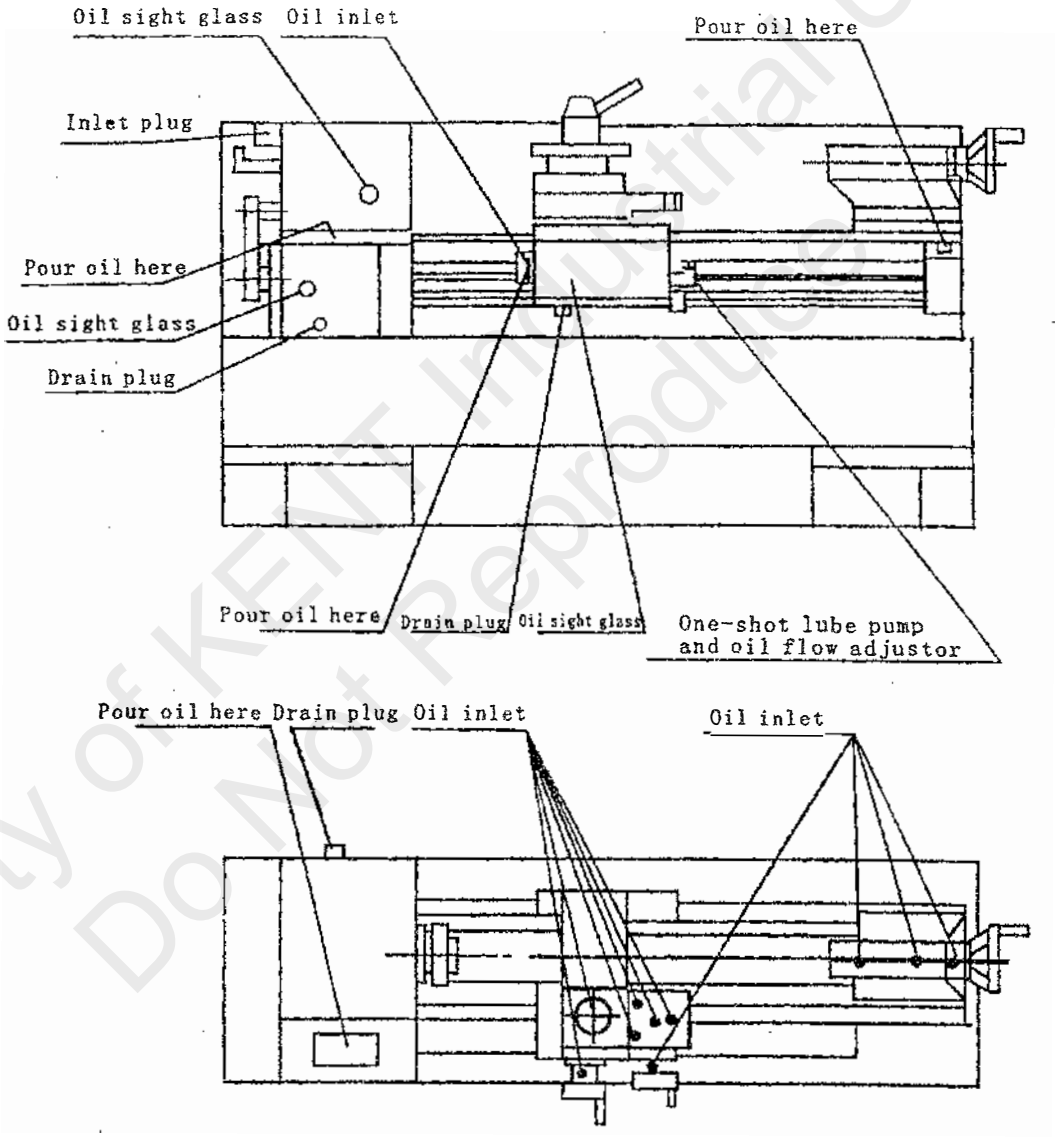
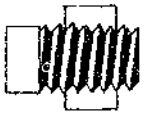
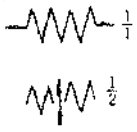
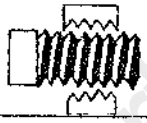
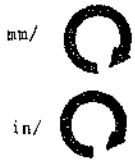
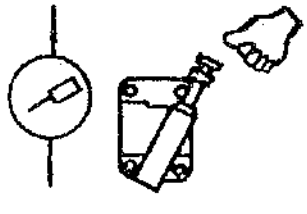
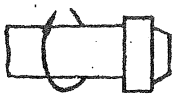
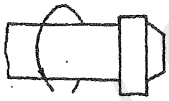


Fig.4 Lubrication Charts

5 Operation

5.1 Symbols of operation

	Spindle jog		Metric threads
	Power supply Green: ON Red: OFF		Inch threads
	Signal lamp		Module pitch threads
	Coolant Green: ON Red: Off		Diametric pitch threads
	Half-nut close		Longitudinal feeds. Cross feeds half longitudinal values.
	Half-nut open		Disengaged Feeding Engaged
	Don't change speed while the machine is running.		
	Cross feeding can be obtained by pushing the knob (the first line) Thread cutting can be obtained by keeping the knob on Neutral position (the second line) Longitudinal feeding can be obtained by pulling out the knob (the third line)		

	Right hand thread and longitudinal feeding toward the headstock side		
	Left hand thread and longitudinal feeding toward the tailstock side		
	Auto feeding per revolution in Metric Auto feeding per revolution in Inch		
 (For KLS)	Lube pump: manual		
	Cone clutch: adjust clockwise		
	Main spindle reverse rotation (clockwise rotation viewing from tasilstock)		
	Main spindle forward rotation (counter-clockwise rotation viewing from tasilstock)		
	Lube flow adjustment counter-clockwise	 Red	Emergency stop

5.2 Machine operation diagram(See Fig.5)

（1） Spindle speed 4-step gear shifting lever; spindle speed 3-step gear shifting lever (for KLS-1$\frac{8}{6}$40GD, KLS-1840D/B only)

（2） Spindle speed H/L gear shifting lever

（3） Feed direction selection knob

（4） Feed Ⅰ/Ⅱ selection knob

（5） Feed selection knob

（6） Feed selection knob

（7） Feed selection knob

（8） 8-step feed selection dial

（9） Inching (Jog) button

（10） Emergency stop button

（11） Power switch

（12） Coolant supply selector

（13） Power indicator

（14） Automatic feed stop selection wheel

（15） Foot brake pedal

（16） Half-nut engage lever

（17） Feed engage lever

（18） Trip acting arm

（19） Feed axis selector

（20） Cone clutch adjustor

（21） Apron handwheel

（22） Spindle control lever

（23） One-shot way lube pump

（24） Lube flow adjustor

（25） Tailstock handwheel

（26） Tailstock clamping lever

（27）Tailstock quill lock lever

（28）Adjustable trip dogs

（29）Compound rest handle

（30）Carriage locking bolt

（31）Cross slide locking screw

（32）Toolpost clamping lever

（33）Compound rest locking screw

（34）Cross slide handle

(35) Motor speed H/L selection switch (for KLS-1$\frac{8}{6}$40A double-speed motor only)

(36) Spindle speed H/L selection switch (for KLS-1$\frac{8}{6}$40DG, KLS-1840D/B only)

5.3 Preparation before starting (refer to Fig.5)

(1) Make sure the machine is thoroughly and properly lubricated.

(2) Check for proper clearance between change gears. Turn the main spindle by hand to make sure it can be rotated easily.

(3) Turn the power switch (11) to "ON" position, and the power indicator (13) lights.

(4) After all the above are done, push inching button (9) momentarily to check rotation direction of spindle. (Main spindle rotation direction should be counter-clockwise looking from the tailstock). If the direction is wrong, it can be rectified by interchanging two of the three-phase lines in the power source. After the rotation direction is rectified, operate the spindle control lever first in low speed then in high speed.

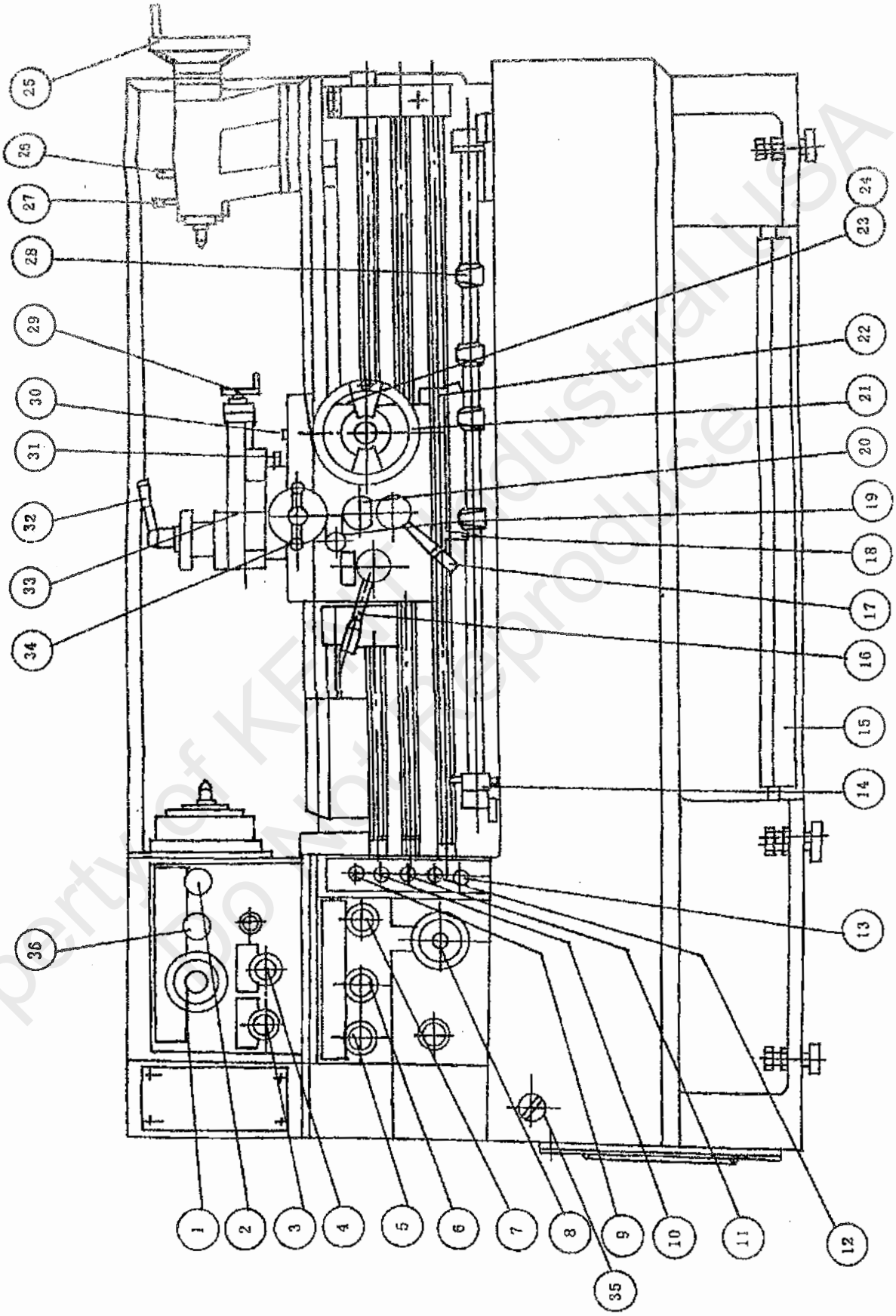


Fig.5 Machine operation Diagram

5.4 Headstock

Housing:

This heavy rigid casting is precision-bored to provide the most accurate solid support for the fully hardened and precision ground spindle, gears and all kinds of shafts. The full range of spindle speeds are obtained through change gears.

Spindle

The massive alloy steel spindle is supported on the three high precision bearings. Two closely coupled taper roller bearings offer maximum axial and radial load capabilities and a precision deep groove ball bearing supports the outboard end of spindle.

Spindle bearing adjustment (refer to Fig. 6)

After long time use, it becomes necessary to tighten the spindle bearings, use the following procedure:

（1） Remove the headstock cover.

（2） Position "High/Low" gear shift lever to "NEUTRAL"(spindle stops rotating).

（3） Loosen "gear positioning nut"(2# in Fig.6) at least one full turn. Requires first loosening the locking screw on castellated nut so that nut can turn.

（4） Tighten "bearing adjustment screw" 3# or nut No.3 by using spanner wrench. Don't over tighten ! Spindle should be snug but free to rotate by hand. The maximum end float should not exceed 0.0002″/0.0003″.

（5） Retighten "locking nut", and tighten "locking screw".

（6） Tighten "gear positioning nut" to prevent endwise float of spindle gears. When this nut is fully tightened, find the locking screw (1#) on the castellated nut and tighten it to prevent the nut from working loose.

（7） Replace the headstock cover and re-check spindle rotation by hand.

（8） Place "High/Low" gear shift lever in "Low" position. Check spindle rotation by using the jog button. If all same good, select a low to medium speed, turn the machine on and allow the spindle to run in a "no load" condition for 20-30 minutes. Check the spindle nose bearing temperature with your hand. If there is a significant heat building up,

recheck the bearing adjustment and correct if necessary. Do not allow the bearing to overheat!

Note: For proper adjustment, spindle end float should not exceed 0.005mm(0.0002″)-0.008mm(0.0003″).

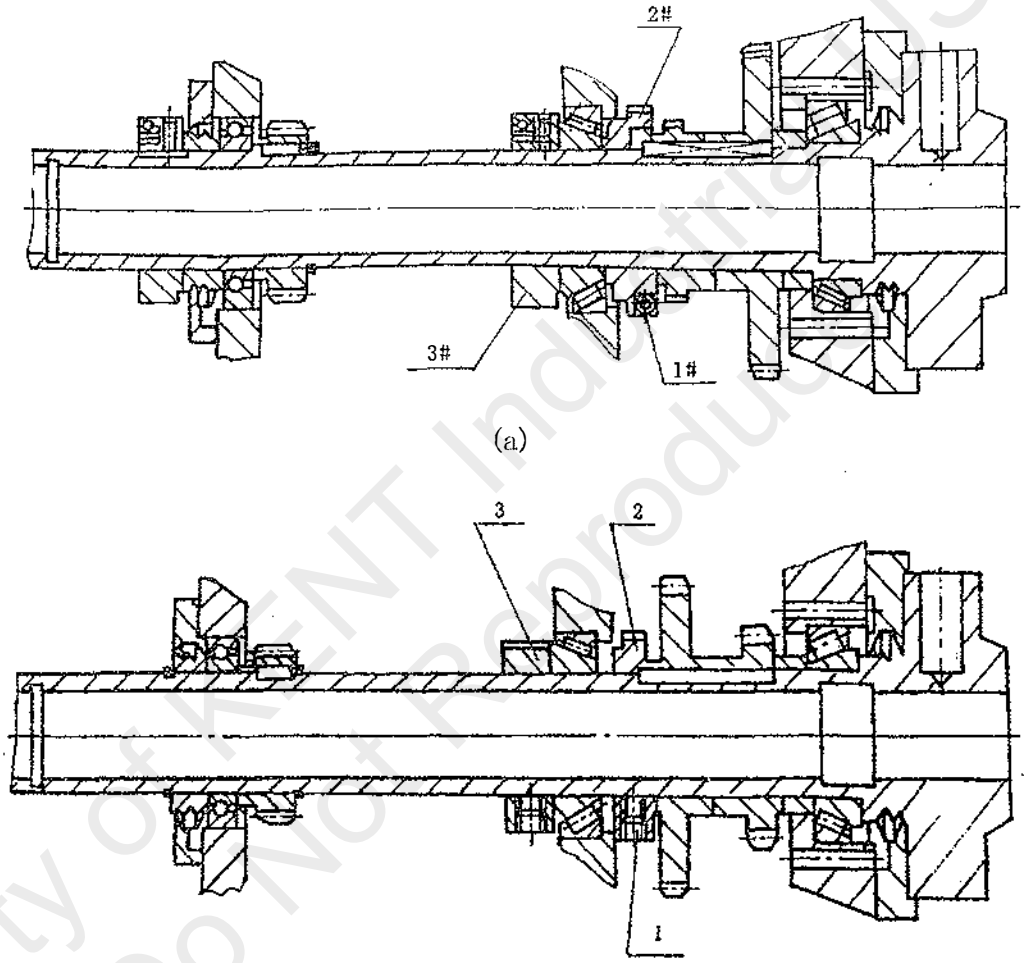


Fig.6 Spindle Adjustment Diagram

Note: (a) for kls-1$\frac{8}{6}$40A series lathe only; （b）for kls-1$\frac{8}{6}$40GD series lathe only.

Operation: (refer to Fig.5)

Caution: DO NOT SHIFT GEARS WHILE SPINDLE IS TURNING!

To assist shifting, rotate spindle by hand. When shifting gears, refer to the speed chart on the front face of the headstock.

When selecting spindle speeds, perform it by positioning the spindle speed H/L gear shifting

lever (2) and 4-step gear shifting lever (1) as indicated on the speed chart; or perform it by positioning the motor speed selection lever (35), the spindle speed H/L gear shifting lever (2) and

4-step gear shifting lever (1) as indicated on the speed chart, for KLS-$\frac{8}{6}$40A(double-speed motor) lathe.

For KLS $\frac{8}{6}$40GD lathes, spindle speed can be changed by moving H/L gear shifting lever (2), +/- lever (36) and 3-step gear shifting lever (1) to different positions as indicated on the speed chart.

The feed direction selection knob (3) has three operation positions: forward, neutral and reverse. This knob can be used for selecting threading and feed direction.

Caution: BE CERTAIN GEARS ARE PROPERLY ENGAGED BEFORE STARTING!

Feed change device:

The quick relieving and smooth fine feeding (quick change over from roughing to fine feeding) can be obtained by operating the two step feed change gears according to following steps.

(1) Stop the spindle by placing the spindle control lever (22) to "Neutral" position.

(2) a. Rotate the feed selection knob Ⅰ/Ⅱ (4) from Ⅰ to Ⅱ position for quick relieving (rough feed);

b. Rotate the feed selection knob Ⅰ/Ⅱ from Ⅱ to Ⅰ position for smooth fine feeding;

(3) Start the spindle by placing the spindle control lever (22) downward or upward.

Spindle nose (refer to Fig.7)

Mounting of chucks, face plates and other spindle mounted attachments.

Ensure that the location faces on both spindle nose and attachment are scrupulously clean.

Check that all the cams are in the release positions.

Mount the attachment onto the spindle nose and lock each cam by turning it clockwise using the key provided.

When mounting, a reference line R1 should be scribed on each chuck or face plate to coincide with the reference line R on the spindle nose. This assists subsequent re-mounting. When using other model machine attachments (spindle attachment), you must be sure that each cam can be locked correctly.

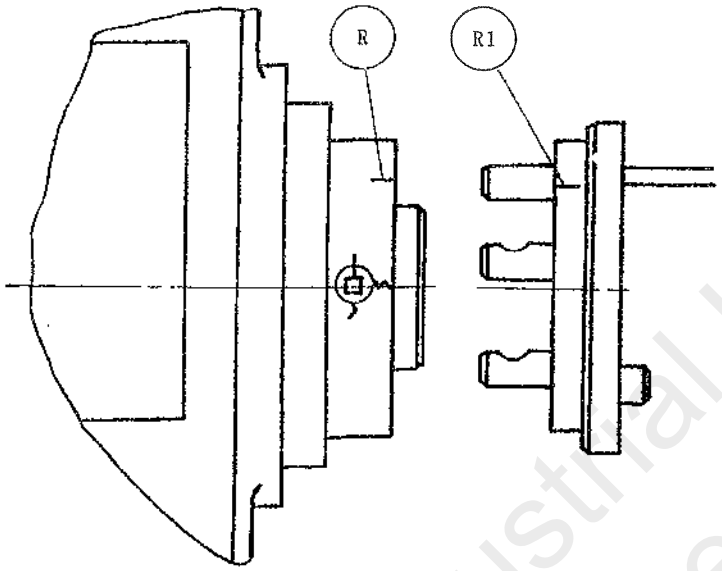


Fig. 7 Attachment Connection

Adjustment (refer to Fig.8)

Remove lock screw B (Fig.8).

Turn the stud A one full turn, in or out as required.

Re-fit and tighten lock screw B.

Note: A datum ring C is marked on each stud as a guide to the original or initial setting.

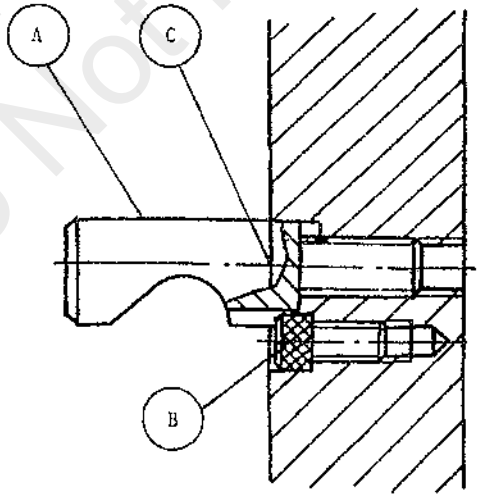


Fig.8 Stud Adjustment Diagram

5.5 Quick change gear box

Function: it provides a means of changing rate of feed or pitch of thread to be cut.

It has been designed to handle both Inch and Metric threads and feeds simply through shifting

levers.

Caution: DO NOT SHIFT QUICK GEARS AT SPEEDS ABOVE 325R/MIN.

Operation (refer to Fig.5):

（1） Feed:

a) Set desired feed rate. (refer to the feed chart)

b) With spindle running at desired speed, engage lever (7) on apron.

The distance the saddle travels during one revolution of the spindle is called feed and will be established as above.

（2） Thread pitch/lead

a) Set desired pitch (lead) tpi (thread per inch).

b) With spindle running at desired speed, engage half-nut (16)(lever on apron).

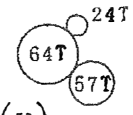
The distance the saddle travels during one revolution of the spindle is called lead or pitch. The number of revolutions the spindle makes while the saddle (tool) travels is equal to "threads per inch" (tpi).

Remarks: In normal turning/facing operations, it is recommended that the "leadscrew" be disengaged to avoid any possible wear.

To disengage leadscrew: Place knob (7) to "T" position.

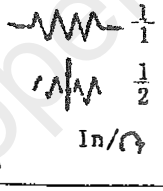
5.6 Thread and feed chart

Leadscrew
4 TPI



(v)

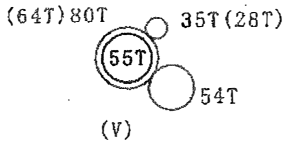
(w)

 (V)	LEVER	1	2	3	4	5	6	7	8
	ICRY	32	36	40	44	46	48	52	56
	ICSY	16	18	20	22	23	24	26	28
	ICTY	8	9	10	11	11 1/2	12	13	14
	IICSY	4	4 1/2	5	5 1/2	5 3/4	6	6 1/2	7
	IICTY	2	2 1/4	2 1/2	2 3/4	2 7/8	3	3 1/4	3 1/2
 (V)	IATW	0.4	0.45	0.5	0.55		0.6	0.65	0.7
	IBTW	0.5					0.75		
	IASW	0.8	0.9	1.0	1.1	1.15	1.2	1.3	1.4
	IBSW	1.0		1.25			1.5		1.75
	IARW	1.6	1.8	2.0	2.2	2.3	2.4	2.6	2.8
	IBRW	2.0	2.25	2.5	2.75		3.0	3.25	3.5
	IIBSW	4.0	4.5	5.0	5.5	5.75	6.0	6.5	7.0
	IIBRW	8.0	9.0	10	11	11.5	12	13	14
 (W)	ICRY	32	36	40	44	46	48	52	56
	ICSY	16	18	20	22	23	24	26	28
	ICTY	8	9	10	11	11 1/2	12	13	14
	IICSY	4	4 1/2	5	5 1/2	5 3/4	6	6 1/2	7
 (W)	IATW	0.4	0.45	0.5	0.55		0.6	0.65	0.7
	IBTW	0.5					0.75		
	IASW	0.8	0.9	1.0	1.1	1.15	1.2	1.3	1.4
	IBSW	1.0		1.25			1.5		1.75
	IARW	1.6	1.8	2.0	2.2	2.3	2.4	2.6	2.8
	IBRW	2.0	2.25	2.5	2.75		3.0	3.25	3.5
	IIBSW	4.0	4.5	5.0	5.5	5.75	6.0	6.5	7.0
 (V)	LEVER	1	2	3	4	5	6	7	8
	IATX	0.0012	0.0014	0.0015	0.0016	0.0017	0.0018	0.0020	0.0022
	IASX	0.0024	0.0028	0.0030	0.0032	0.0034	0.0036	0.0040	0.0044
	IARX	0.0048	0.0056	0.0060	0.0064	0.0068	0.0072	0.0080	0.0088
	IIASX	0.0096	0.0112	0.0120	0.0128	0.0136	0.0144	0.0160	0.0176
	IIARX	0.0192	0.0224	0.0240	0.0256	0.0272	0.0288	0.0320	0.0352

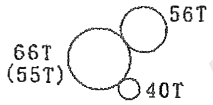
(The chart is applicable to KLS-$1\frac{8}{16}$ 00 Inch series lathes.)

Caution: Be sure to choose correct change gears to cut the desired thread.

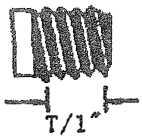
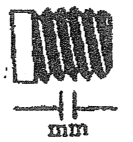
Leadscrew
P=6mm



(V)



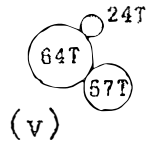
(W)

 (V)	LEVER	1	2	3	4	5	6	7	8
	ICRY	32	36	40	44	46	48	52	56
	ICSY	16	18	20	22	23	24	26	28
	ICTY	8	9	10	11	11 1/2	12	13	14
	IICSY	4	4 1/2	5	5 1/2	5 3/4	6	6 1/2	7
	IICTY	2	2 1/4	2 1/2	2 3/4	2 7/8	3	3 1/4	3 1/2
 (V)	IATW	0.4	0.45	0.5	0.55		0.6	0.65	0.7
	IBTW	0.5					0.75		
	IASW	0.8	0.9	1.0	1.1	1.15	1.2	1.3	1.4
	IBSW	1.0		1.25			1.5		1.75
	IARW	1.6	1.8	2.0	2.2	2.3	2.4	2.6	2.8
	IBRW	2.0	2.25	2.5	2.75		3.0	3.25	3.5
	IIBSW	4.0	4.5	5.0	5.5	5.75	6.0	6.5	7.0
	IIBRW	8.0	9.0	10	11	11.5	12	13	14
 (W)	ICRY	32	36	40	44	46	48	52	56
	ICSY	16	18	20	22	23	24	26	28
	ICTY	8	9	10	11	11 1/2	12	13	14
	IICSY	4	4 1/2	5	5 1/2	5 3/4	6	6 1/2	7
 (W)	IATW	0.4	0.45	0.5	0.55		0.6	0.65	0.7
	IBTW	0.5					0.75		
	IASW	0.8	0.9	1.0	1.1	1.15	1.2	1.3	1.4
	IBSW	1.0		1.25			1.5		1.75
	IARW	1.6	1.8	2.0	2.2	2.3	2.4	2.6	2.8
	IBRW	2.0	2.25	2.5	2.75		3.0	3.25	3.5
	IIBSW	4.0	4.5	5.0	5.5	5.75	6.0	6.5	7.0
 (V)	LEVER	1	2	3	4	5	6	7	8
	IATX	0.032	0.036	0.040	0.044	0.046	0.048	0.052	0.056
	IASX	0.064	0.072	0.080	0.088	0.092	0.096	0.104	0.112
	IARX	0.128	0.144	0.160	0.176	0.184	0.192	0.208	0.224
	IIASX	0.256	0.288	0.320	0.352	0.368	0.384	0.416	0.448
	IIARX	0.512	0.576	0.640	0.704	0.736	0.768	0.832	0.896

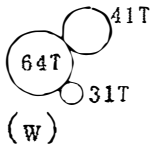
Note: 1.The chart is applicable to KLS $\frac{8}{6}$00 Metric lathes.

2.The teeth number of change gears in brackets is for KLS and KLS-1800D/B; the teeth number without brackets is for KLS-1800.

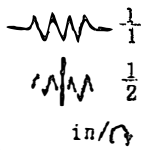
Leadscrew 4TPI



(V)



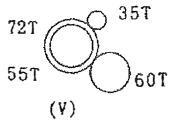
(W)

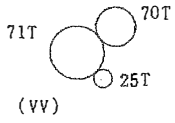
 (V)	LEVER	1	2	3	4	5	6	7	8
	ICRY	32	36	40	44	46	48	52	56
	ICSY	16	18	20	22	23	24	26	28
	ICTY	8	9	10	11	11 1/2	12	13	14
	IICSY	4	4 1/2	5	5 1/2	5 3/4	6	6 1/2	7
	IICTY	2	2 1/4	2 1/2	2 3/4	2 7/8	3	3 1/4	3 1/2
 (V)	IATW	0.4	0.45	0.5	0.55		0.6	0.65	0.7
	IBTW	0.5					0.75		
	IASW	0.8	0.9	1.0	1.1	1.15	1.2	1.3	1.4
	IBSW	1.0		1.25			1.5		1.75
	IARW	1.6	1.8	2.0	2.2	2.3	2.4	2.6	2.8
	IBRW	2.0	2.25	2.5	2.75		3.0	3.25	3.5
	IIBSW	4.0	4.5	5.0	5.5	5.75	6.0	6.5	7.0
	IIBRW	8.0	9.0	10	11	11.5	12	13	14
 (W)	ICRY	32	36	40	44	46	48	52	56
	ICSY	16	18	20	22	23	24	26	28
	ICTY	8	9	10	11	11 1/2	12	13	14
	IICSY	4	4 1/2	5	5 1/2	5 3/4	6	6 1/2	7
 (W)	IATW	0.4	0.45	0.5	0.55		0.6	0.65	0.7
	IBTW	0.5					0.75		
	IASW	0.8	0.9	1.0	1.1	1.15	1.2	1.3	1.4
	IBSW	1.0		1.25			1.5		1.75
	IARW	1.6	1.8	2.0	2.2	2.3	2.4	2.6	2.8
	IBRW	2.0	2.25	2.5	2.75		3.0	3.25	3.5
	IIBSW	4.0	4.5	5.0	5.5	5.75	6.0	6.5	7.0
 (V)	LEVER	1	2	3	4	5	6	7	8
	IATX	0.0013	0.0015	0.0017	0.0018	0.0019	0.0020	0.0022	0.0023
	IASX	0.0026	0.0030	0.0034	0.0036	0.0038	0.0040	0.0044	0.0046
	IARX	0.0052	0.0060	0.0068	0.0072	0.0076	0.0080	0.0088	0.0092
	IIASX	0.0104	0.0120	0.0136	0.0144	0.0152	0.0160	0.0176	0.0184
	IIARX	0.0208	0.0240	0.0272	0.0288	0.0320	0.0320	0.0352	0.0368

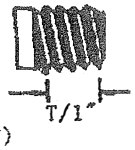
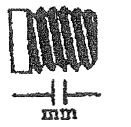
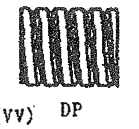
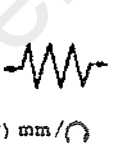
The chart is applicable to KLS-18$_6$/40 Inch lathes.

Longitudinal lead screw P=6mm

Cross feed rod P=4mm

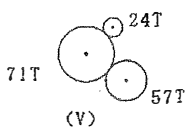


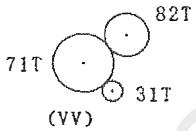


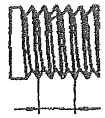
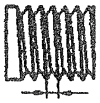
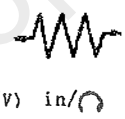
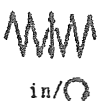
 (V)	LEVER	1	2	3	4	5	6	7	8	9	10
	IIAER	64	72	76	80	88	92	96	104	108	112
	IIAFR	32	36	38	40	44	46	48	52	54	56
	IIBFR	16	18	19	20	22	23	24	26	27	28
	IAFR	8	9	9 1/2	10	11	11 1/2	12	13	13 1/2	14
	IBFR	4	4 1/2	4 3/4	5	5 1/2	5 3/4	6	6 1/2	6 3/4	7
 (V)	IICFU	0.25									
	IICDS	0.5						0.75			
	IICDU	1			1.25			1.5			1.75
	ICDS	2	2.25		2.5	2.75		3	3.25		3.5
	ICDU	4	4.5	4.75	5	5.5	5.75	6	6.5	6.75	7
 (VV) DP	IIADR	64	72	76	80	88	92	96	104	108	112
	IIAER	32	36	38	40	44	46	48	52	54	56
	IIAFR	16	18	19	20	22	23	24	26	27	28
	IIBFR	8	9	9 1/2	10	11	11 1/2	12	13	13 1/2	14
	IAFR	4	4 1/2	4 3/4	5	5 1/2	5 3/4	6	6 1/2	6 3/4	7
 (VV) MP	IICFS	0.25									
	IICES	0.5						0.75			
	IICDS	1			1.25			1.5			
	IICDU	2	2.25		2.5	2.75		3	3.25		3.5
	ICDS	4	4.5	4.75	5	5.5	5.75	6	6.5	6.75	7
	ICDU	8	9	9.5	10	11	11.5	12	13	13.5	14
 (V) mm/r	LEVER	1	2	3	4	5	6	7	8	9	10
	IICFT	0.030	0.034	0.036	0.038	0.042	0.043	0.046	0.049	0.051	0.053
	IICET	0.061	0.068	0.072	0.076	0.084	0.087	0.091	0.099	0.102	0.106
	ICFT	0.121	0.136	0.144	0.152	0.167	0.175	0.182	0.197	0.205	0.213
	ICET	0.243	0.273	0.289	0.304	0.334	0.349	0.364	0.395	0.410	0.425
	ICDT	0.486	0.547	0.577	0.607	0.668	0.698	0.729	0.790	0.820	0.850
 (V) mm/r	IICFT	0.010	0.011	0.012	0.013	0.014	0.014	0.015	0.016	0.017	0.018
	IICET	0.020	0.023	0.024	0.025	0.028	0.029	0.030	0.033	0.034	0.036
	IICDT	0.041	0.046	0.049	0.051	0.056	0.059	0.061	0.066	0.069	0.072
	ICET	0.082	0.093	0.097	0.103	0.113	0.118	0.123	0.133	0.138	0.143
	ICDT	0.163	0.184	0.194	0.197	0.225	0.235	0.246	0.266	0.276	0.286

The chart is applicable to KLS Metric lathes.

Longitudinal lead screw 4TPI
Cross feed rod 10TPI





	LEVER	1	2	3	4	5	6	7	8	9	10
 (V) T/1"	IIAER	64	72	76	80	88	92	96	104	108	112
	IIAFR	32	36	38	40	44	46	48	52	54	56
	IIBFR	16	18	19	20	22	23	24	26	27	28
	IAFR	8	9	9 1/2	10	11	11 1/2	12	13	13 1/2	14
	IBFR	4	4 1/2	4 3/4	5	5 1/2	5 3/4	6	6 1/2	6 3/4	7
 (V) mm	IICFU	0.25									
	IICDS	0.5						0.75			
	IICDU	1			1.25			1.5			1.75
	ICDS	2	2.25		2.5	2.75		3	3.25		3.5
	ICDU	4	4.5	4.75	5	5.5	5.75	6	6.5	6.75	7
 (VV) DP	IIADR	64	72	76	80	88	92	96	104	108	112
	IIAER	32	36	38	40	44	46	48	52	54	56
	IIAFR	16	18	19	20	22	23	24	26	27	28
	IIBFR	8	9	9 1/2	10	11	11 1/2	12	13	13 1/2	14
	IAFR	4	4 1/2	4 3/4	5	5 1/2	5 3/4	6	6 1/2	6 3/4	7
 (VV) MP	IICFS	0.25									
	IICES	0.5						0.75			
	IICDS	1			1.25			1.5			1.75
	IICDU	2	2.25		2.5	2.75		3	3.25		3.5
	ICDS	4	4.5	4.75	5	5.5	5.75	6	6.5	6.75	7
	ICDU	8	9	9.5	10	11	11.5	12	13	13.5	14
 (V) in/r	LEVER	1	2	3	4	5	6	7	8	9	10
	IICFT	.0011	.0012	.0013	.0014	.0015	.0016	.0017	.0018	.0019	.0020
	IICET	.0023	.0025	.0027	.0028	.0031	.0032	.0034	.0037	.0038	.0040
	ICFT	.0045	.0051	.0054	.0056	.0062	.0065	.0068	.0073	.0076	.0079
	ICET	.0090	.0102	.0107	.0113	.0124	.0130	.0135	.0147	.0153	.0158
	ICDT	.0181	.0203	.0215	.0226	.0249	.0260	.0271	.0294	.0305	.0316
 (V) in/r	IICFT	.00024	.00027	.00029	.00030	.00033	.00035	.00036	.00039	.00041	.00042
	IICET	.00048	.00055	.00057	.00060	.00067	.00069	.00073	.00079	.00082	.00085
	IICDT	.00097	.00108	.00114	.00121	.00133	.00139	.00145	.00157	.00163	.00169
	ICET	.00133	.00218	.00240	.00242	.00266	.00278	.00290	.00315	.00326	.00338
	ICDT	.00337	.00435	.00459	.00434	.00531	.00536	.00580	.00638	.00653	.00680

The chart is applicable to KL5-50 Inch lathes.

5.7 Safety devices

Safety devices are provided for both the leadscrew and feed rod.

Leadscrew:

The leadscrew is protected from damage from overload by a safety shear pin.

The pin is located in the upper output shaft at the right hand end of the quick change gear box.

The shear pin material is copper. (Fig. 9)

Dimension: ϕ 4mm h9($^{0}_{-0.03}$). diameter $\times$ 25 long.

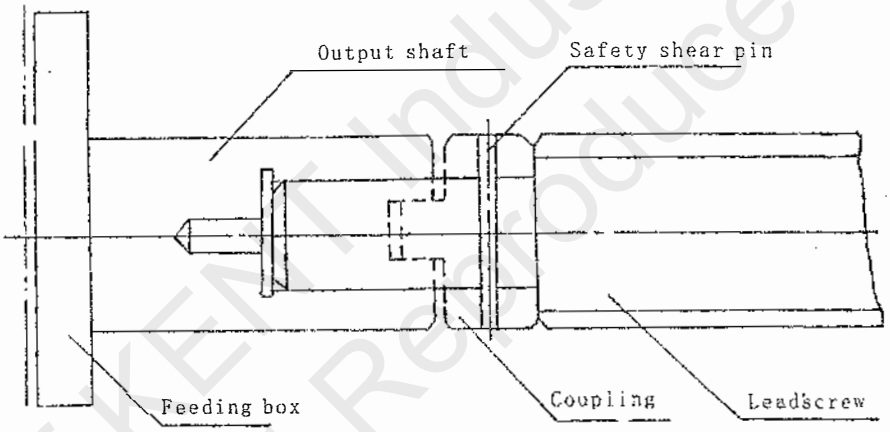


Fig. 9 Leadscrew Safety Device Diagram

Rod:

The feed rod and feed gears are protected from overload by an adjustable tension cone clutch in the apron. (Fig.10)

Adjustment:

Turn the adjustment screw in clockwise to increase driving power.

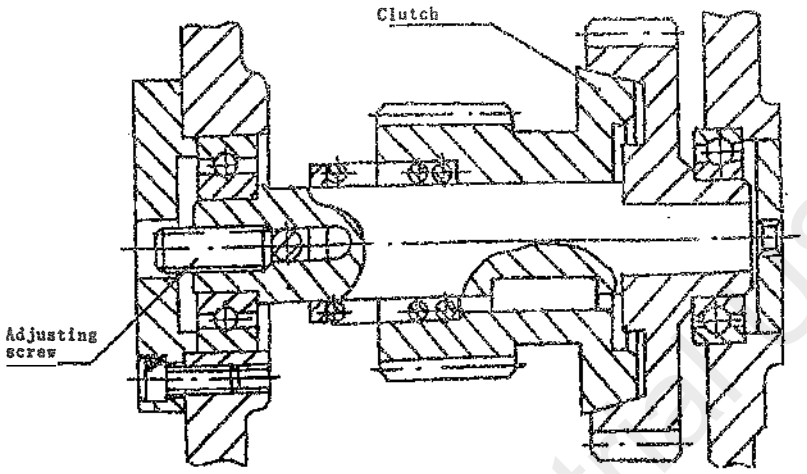


Fig. 10 Safety Clutch Adjustment

5.8 Apron

The apron (left handwheel and right handwheel) controls the automatic feeding and threading with a positive interlock between the two functions to prevent simultaneous engagement. The oil reservoir supplies oil to all of its moving parts and a "one shot" pump distributes lubricant to the saddle ways, bed ways and cross slide ways.

Feed (refer to Fig. 5):

Manual: The apron handwheel (21) may be used to traverse the saddle longitudinally at manual feed rate.

Power-driven: Either longitudinal or cross are selected by positioning feed axis selector (19) "IN" (on the first line) for cross feed, "OUT" (on the third line) for longitudinal feed.

Engagement: After direction is determined, push feed engage lever (17) downward till fully engaged.

Disengagement: Lift the feed engage lever.

Cone clutch adjustor is an overload protection mechanism for the feed system. To adjust: tighten the adjustor in clockwise to increase feeding power.

The automatic feed disengagement system operates when the adjustable trip dogs (28) come in

contact with the trip acting arm (18) as the apron is moving longitudinally. The trip dogs are controlled/ engaged by rotating the trip dog to the frontward position with the selection wheel (14) at the headstock end of the rod.

Threading:

The half-nut lever (16) engages/disengages the half-nut and leadscrew. The feed axis selector (19) must be in neutral (on the second line) to engage the half-nut. The spindle should be rotating at a relatively low speed to properly engage half-nut, especially for rough threading.

5.9 Thread dial indicator

The thread dial indicator is for the purpose of determining the correct time and position for leadscrew engaging/disengaging to the half-nut when multiple feeding.

The dial is calibrated and the chart on the front of the housing indicates what calibrations offer the correct position for half-nut engagement.

The thread dial indicator should be disengaged from the leadscrew when not in use.

（1） Metric threads on Metric leadscrew machines or Inch threads on Inch leadscrew machines.

For these threads, it is recommended to use the "thread dial indicator", because this allows the leadscrew nuts to be disengaged correctly at the end of each screw cutting pass, and to be reengaged correctly in accordance with the chart mounted on the front face of the dial unit.

The chart of Metric leadscrew machines shows (Fig. 11):

In column 1: pitch mm to be cut.

In column 2: The number of teeth in the "pick-off gears" arranged to mesh with the leadscrew.

In column 3: The dial number at which the leadscrew nuts may be engaged.

The chart of Inch leadscrew machines shows (Fig, 12):

In column 1: tpi (threads per inch) to be cut.

In column 2: The dial numbers at which the leadscrew nuts may be engaged.

(2) Inch threads on Metric leadscrew machines or Metric threads on Inch leadscrew machines and diametric pitch, module pitch threads on Metric or Inch leadscrew machines.

INDICATOR TABLE					
0.25	16	1-8	2.5	15	1
0.3	16	1-8	3	16	1-8
0.35	14	1.5	3.5	14	1.5
0.4	16	1-8	4	16	1-8
0.45	15	1	4.5	15	1
0.5	16	1-8	5	15	1
0.6	16	1-8	5.5	22	1.5
0.7	14	1.5	6	16	1-8
0.8	16	1.8	7	14	1.5
1.0	16	1.8	8	16	1.3.5.7
1.25	15	1	9	15	1
1.5	16	1.8	10	15	1
1.75	14	1.5	11	22	1.5
2.0	16	1.8	12	16	1-8

INDICATOR TABLE			
11T	2.75	5.5	1
13T	3.25	6.5	
14T	1.75	3.5	
	7		
	0.5	0.75	1~7
	1	1.5	
	2	3	
	4	6	
15T	1.25	2.5	1
	5		
	2.25	4.5	
18T	6.75		

(For KLS 50 lathe)

Fig. 11 Indicator Table

INDICATOR TABLE					
2	1-8	7	1.3.5.7	18	1-8
2 1/4	1	8	1-8	19	1.3.5.7
2 1/2	1.5	9	1.3.5.7	20	1-8
3	1.3.5.7	9 1/2	1.5	23	1.3.5.7
3 1/4	1	10	1-8	24	1-8
3 1/2	1.5	11	1.3.5.7	28	1-8
4	1-8	11 1/2	1.5	32	1-8
4 1/2	1.5	12	1-8	36	1-8
5	1.3.5.7	13	1.3.5.7	40	1-8
5 1/2	1.5	14	1-8	44	1-8
6	1-8	15	1-8	48	1-8

INDICATOR TABLE		
4 1/2 11 1/2 13 1/2 23	16T	2
5, 7 9, 11 3, 19 26, 27		4
OTHER EVEN NUMBER THREADS		8

(For KLS 50 lathe)

Fig. 12 Indicator Table

For these threads, the leadscrew nuts are kept engaged throughout the cutting of any one thread. This involves reversing the whole drive by means of spindle control ever (22# of Fig. 5) at each end of the screw cutting pass while at the same time relieving or increasing the cut as required.

5.10 Saddle, cross slide and compound rest

The saddle is solidly supported and accurately guided by "V" bed way in front and the flat bed way at the rear. Large "dove-tail" ways supported and guide both the cross slide and compound rest to offer smooth movement and solid support for the tool.

Both cross slide and compound rest are equipped with tapered-fully adjustable gibs.

Gib adjustment

（1） Position the slide (lengthwise) on the dovetail way.

（2） Loosen the gib locking screw at the rear end of the slide.

（3） Adjust the front gib screw until the slide is snug. Retighten the gib locking screw at the rear end of the slide. DON'T OVER TIGHTEN!

（4） Recheck the fit or feel of the slide and readjust if necessary.

Operation (refer to Fig. 5)

Manual: The carriage (saddle) may be moved manually (longitudinally) either left or right by turning the apron handwheel (21). To use as a feed method, a slow even motion is required.

Note: FEED AXIS SELECTOR (19) MUST BE IN NEUTRAL.

Power driven: The carriage may be power fed longitudinally at various federates selected at the quick change gear box. Before engaging power feed, be sure the carriage locking bolt (30) has been released.

Operation procedures:

(1) Set feed rate at quick change gear box.

(2) Determine direction of feed (feed direction selection knob 3#).

(3) Pull feed axis selector to the "OUT" position (the third line).

(4) Engage feed: move feed engage lever to down position.

Cross slide:

The cross slide also may be operated either manually or under power.

Caution: BEFORE ENGAGING POWER FEED, BE SURE THAT CROSS SLIDE LOCKING SCREW (31) HAS BEEN RELEASED.

Operation:

Manual:

（1） Place feed axis selector (19) in Neutral (the second line) position.

（2） Turn cross slide handle (34) in desired direction. Distance moved can be read on micrometer dial.

Power-driven:

（1） Set desired feed rate at quick change gear box (cross feeds equal half of longitudinal values).

（2） Determine feed direction (feed direction selection knob 3#).

（3） Push feed axis selector (19) to "IN" position (the first line).

（4） Engage feed: move feed engage lever (17) to down position.

（5） To stop: raise feed engage lever (17) to disengaged position.

The compound rest can only be operated manually. It is mounted on a swivel base which enables it to be positioned at any desired angle.

Caution: NO NOT OPERATE COMPOUND REST UNLESS COMPOUND REST LOCKING SCREW (33) HAS BEEN RELEASED.

Operation:

Loosen four "T" shaped bolts so that the swivel base can be positioned at any set angle. All bolts are distributed on the proper and easy operation positions of base flange.

To reposition (change angle setting):

（1） Turn compound rest handle (29) in counter-clockwise.

（2） Loosen the four hold-down bolts.

（3） Swivel the slide to new desired position.

（4） Retighten all hold-down bolts.

（5） Restore the compound rest to the initial position.

Caution: it is dangerous and physical harm could occur if heavy cuts are attempted when the compound rest is extended beyond the end of the base slideways!

5.11 Tailstock

Description:

The heavy, solid tailstock provides rigid support for turning between centers, as well as for drilling and boring operations by using tailstock. The tailstock quill may be equipped with a TANG-DRIVE and DRIFT-SLOT and automatic center ejector. Dual Inch/Metric calibrations are provided on the quill. A device for quick clamping is provided. The handwheel is equipped with a micro-meter dial with Inch/Metric calibrations. Cross adjustment of tailstock provides for easy alignment and for turning small tapers.

It is equipped with a cam action clamp for locking in position on the bed

Adjustment:

Alignment, to correct misalignment (in relation to the headstock):

（1） Place the test bar between dead centers (one end in main spindle taper and the other in tailstock quill taper).

（2） Measure the direction and amount of misalignment (with dial indicator mounted on the saddle, indicator pointer against the side of the test bar, traverse from end to end of test bar).

（3） Unclamp the clamping lever (26# of Fig. 5) for tailstock. Then loosen the two hex. Head bolts that lock the base and tailstock body together.

（4） Slacken the rear "location screw" (half turn).

（5） Then, alternatively slacken one set-over screw and tighten the other until the required setting is achieved (correct alignment). Carefully retighten the rear "location screw" and set-over screw which was slackened before, and recheck alignment;

（6） Retighten the two hex. head bolts securely and re-clamp the tailstock.

Taper-turning/set-over:

Follow the same procedures as for correcting misalignment. Set amount of set-over (taper) by measuring with a scale at the base or more accurately using an indicator mounted on the cross slide with the contact against the side of quill.

Caution:

（1） Don't use excessive pressure on a center point.

（2） Don't use taper shank tools or centers that are scored or damaged.

5.12 Half-nut

The half-nut is exactly what the term implies " a nut in two pieces" (lengthwise).

The two half nut pieces are mounted in the apron in such a way that they can be mechanically separated or brought around the leadscrew threads (disengaged/ engaged). When the leadscrew is rotating engaging the half-nut will cause the apron/carriage to move at the rate determined by the gear ratio set at the quick change gear box, thus moving the tool at the same rate to cut threads.

An interlock device is provided to prevent the accidental engagement of two opposing feeds simultaneously. (Feed engage lever cannot be engaged when half-nut is engaged). The leadscrew and half-nut life is dependent on three basic conditions as following:

（1） Must be clean.

（2） Must be lubricated.

（3） Must be in proper adjustment so as to engage evenly and smoothly.

Design:

The half-nut is mounted (both halves) in alignment with the leadscrew (1/2 above and 1/2 under) in supports that are in turn mounted in dovetail guideways.

To maintain the original smooth and accurate operation of the half-nut, an adjustable gib strip is provided.

Adjustment:

（1） Remove the thread dial indicator.

（2） Loosen the 4 gib adjusting screws and 5 gib mounting screws on the same side as the thread dial indicator (say one half turn for the after).

（3） Adjust 4 gib adjusting screws evenly, central 2 screws first, till proper feel is attained while working the half-nut engagement lever.

（4） When proper feel is attained (should feel smooth, easy and snug with no binding), tighten mounting screws.

（5） Recheck the proper feel of engagement lever, then tighten lock screws.

(6) Observe actual half-nut engagement with the leadscrew to determine that no misalignment exists.

(7) Replace the thread dial indicator.

5.13 Leadscrew

The precision large diameter (Φ32mm), 6mm pitch/4 tpi leadscrew is designed to provide accurate threading capability and long service life. It is protected from overloading by a shear pin. It should be further protected from unnecessary wear by automatic disengagement when not in use. It is comparative that the leadscrew be clean and properly lubricated while threading. In order to obtain the maximum accuracy it is necessary to keep all end play out of the leadscrew and the half-nut. The leadscrew is supported in adjustable ball thrust bearings so that a "No Float" condition can be maintained.

Leadscrew adjustment:

Adjustment is made at the mounting bracket on tailstock end but only if end float or play exists.

(1) Disengage leadscrew by placing feed selection knob (7) in the "T" position.

(2) Remove the end dust cover from the mounting bracket (3 cross recessed head screws).

(3) Loosen set screw in the round locking nut.

(4) Use a proper spanner wrench. Adjust the round locking nut (while rotating the leadscrew by hand to avoid over tightening or binding). Rotation of leadscrew should be free and smooth and have no more than 0.01mm(0.0004″) end play.

(5) Retighten the set screw.

(6) Replace end dust cover.

6 Maintenance and adjustment

6.1 Headstock realignment (refer to Fig.13)

With the lathe bed leveled very accurately, carefully make test cuts to determine the direction and amount the headstock must be shifted by observing the cylindricity of part machined.

Adjustment procedure: at first turn off power at circuit breaker !

（1） Remove the cover of the electrical niche on the back side of the bed under the headstock.

（2） Loosen the "tie down bolt" (1# of Fig.13) inside the electrical cabinet.

（3） Remove the end cover and loosen the two "tie down bolt" a little, which at the outboard end of the bed.

（4） Find 2 headstock alignment bolts and block (wedged between the front and back bed way under the outboard end of the headstock). Correct the misalignment by shifting the headstock with the adjusting bolts (3 and 4 of Fig.13) as indicated. Slightly loosen one bolt then tighten the other against it to shift the headstock in the desired direction. (Caution: tie down bolts and adjusting bolts must not be loosened completely. Adjustment should be made against some tension.)

（5） Retighten all the bolts.

（6） Carefully and lightly do test cutting and check for taper.

（7） Recut, recheck and readjust till condition for taper cutting is obtained.

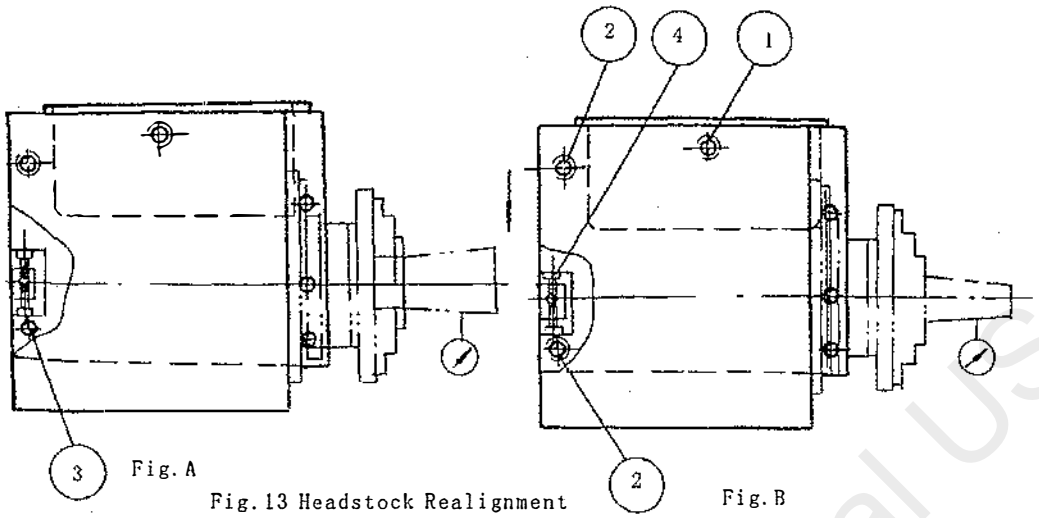


Fig. 13 Headstock Realignment

Note: to correct condition A and B, shift headstock as indicated by appropriate arrow.

6.2 **Drive belts** (refer to Fig.14)

In normal use V-belts will stretch thus requiring periodic tension adjustment.

（1） Remove motor access cover (rear cover for left-hand base under the headstock).

（2） Loosen adjusting nut (3) till desired tension is achieved.

（3） Tighten jamb nut (1).

Note: changing the position of the motor mounting plate (2) will affect the well-adjusted brake device and the micro limit switch. It may be necessary to readjust both (refer to Fig. 14).

6.3 **Brake adjustment** (refer to Fig. 14)

(1) Pedal height: loosen jamb nuts (6) on adjustment bolts (7), make necessary changes with adjusting bolts, and retighten jamb nuts.

(2) Brake band adjustment: remove motor access cover, adjust tension bolt (4) by loosening jamb nuts, then tightening adjusting nut. After well adjustment, do test turning and check adjustment of power limit micro switch (5). Adjust if necessary. Replace motor access cover.

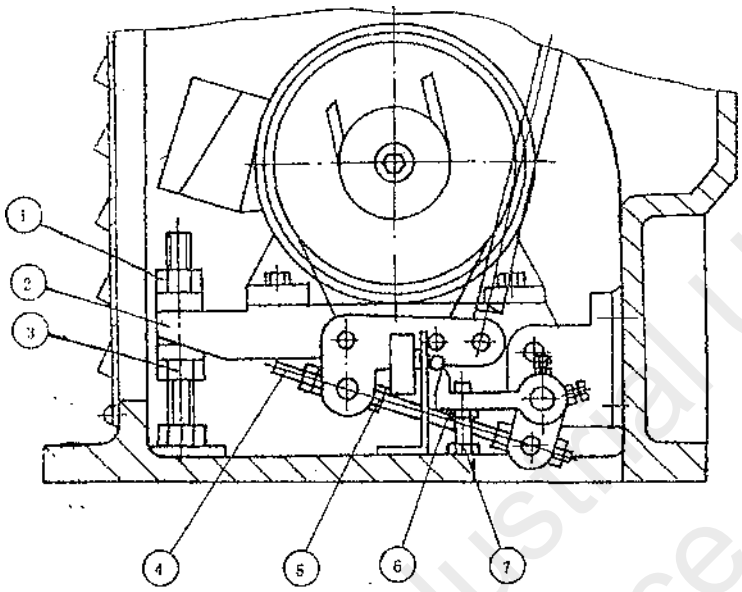


Fig.14 V-belts and Limit Switch Adjustment

6.4 **Saddle adjustment** (refer to Fig. 15)

Prolong/extensive use may require that the carriage (saddle) gibs be readjusted in order to restore original rigidity and accuracy.

Front strip:

Wear on the front saddle strip may be accommodated by rescrapping the contact surface of the strip.

The procedure of adjustment is to remove the socket head cap screws (1) and take off the front strip for rescrapping. Reinstall the strip after being scrapped. Be care to avoid over scrapping.

Rear gib:

Adjustment of rear gib are made by means of the flat gib strip under the rear slide of saddle.

（1） Loosen 4 lock nuts (2) on adjusting screw (3).

（2） Adjust 4 gib adjusting screws evenly, central 2 screws first till the correct adjustment is achieved while working the apron handwheel.

（3） Tighten the lock nuts (2).

（4） Repeat operating (1)～(3) if necessary.

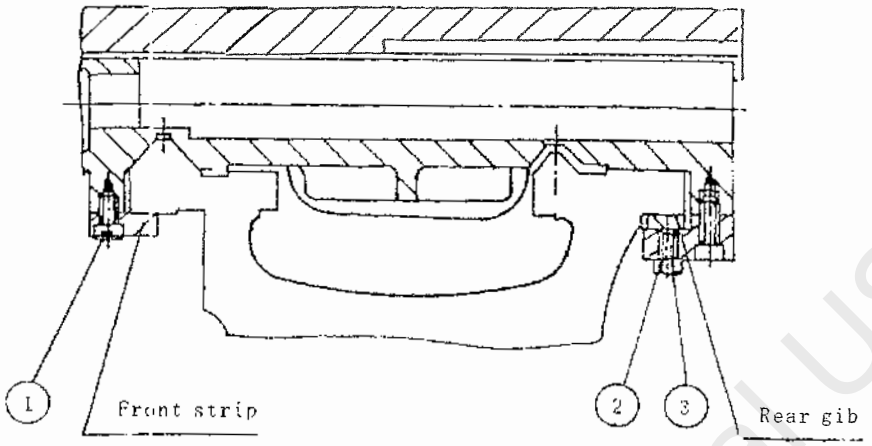


Fig. 15 Gib and Strip Adjustment

6.5 Cross feed screw/nut backlash adjustment (refer to Fig.16)

Loosen screw 5; adjust screw 3 till the backlash of lead screw disappears. Then fasten screw 5, cover the dust-proof cover 2, and screw up screw 4.

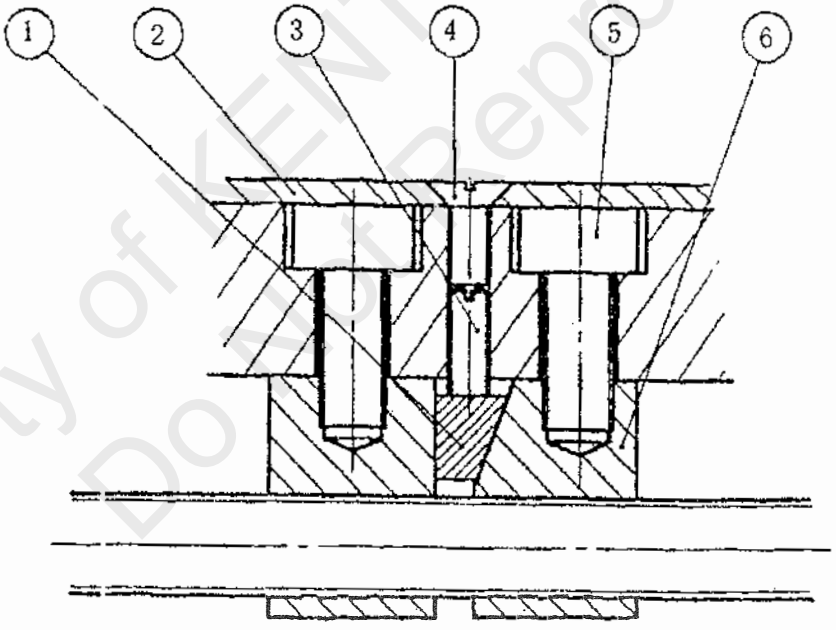


Fig. 16 Cross Feed Screw/Nut Assembly Adjustment

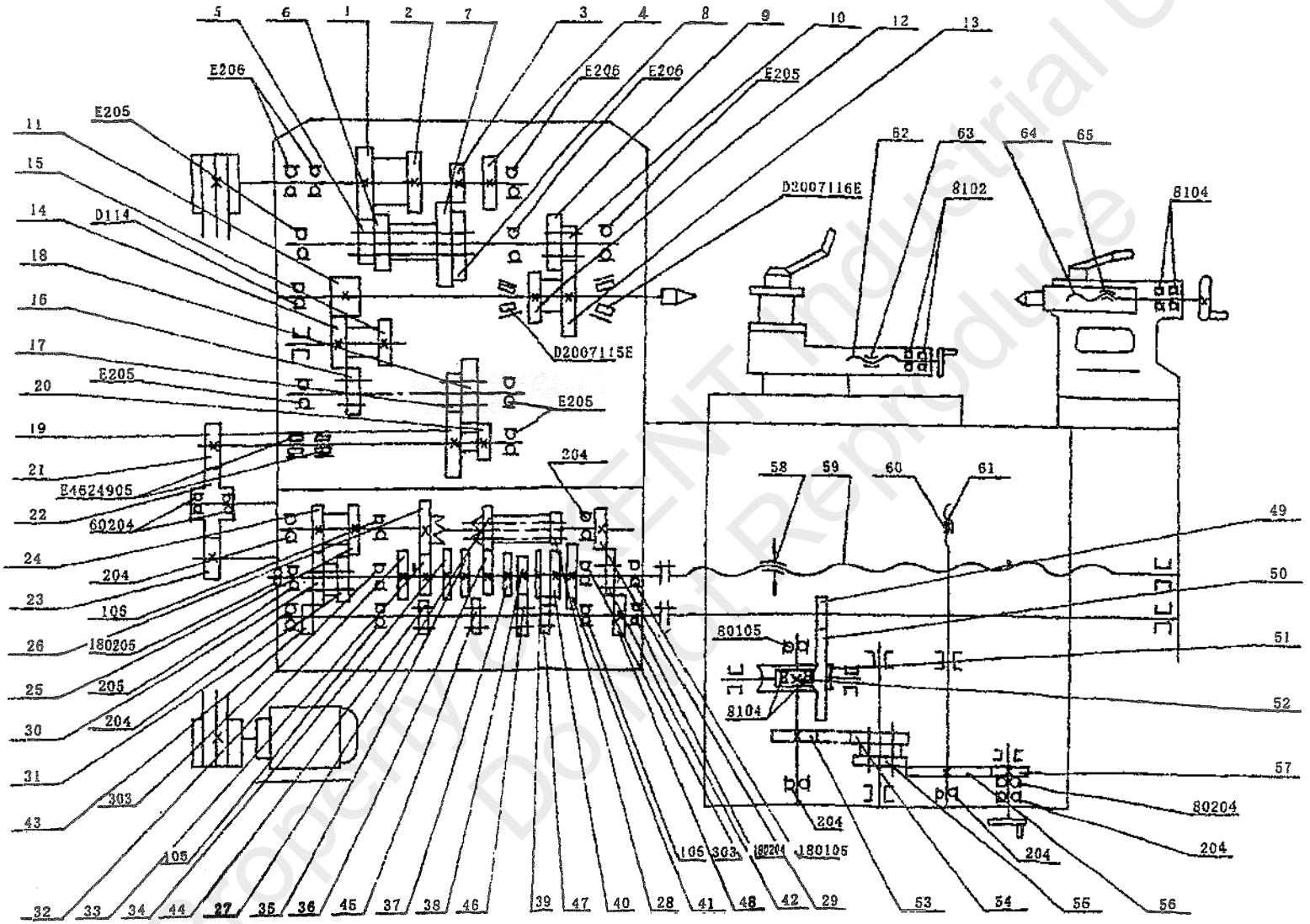


Figure 17. (a) Drive System and Bearing Distribution Diagram

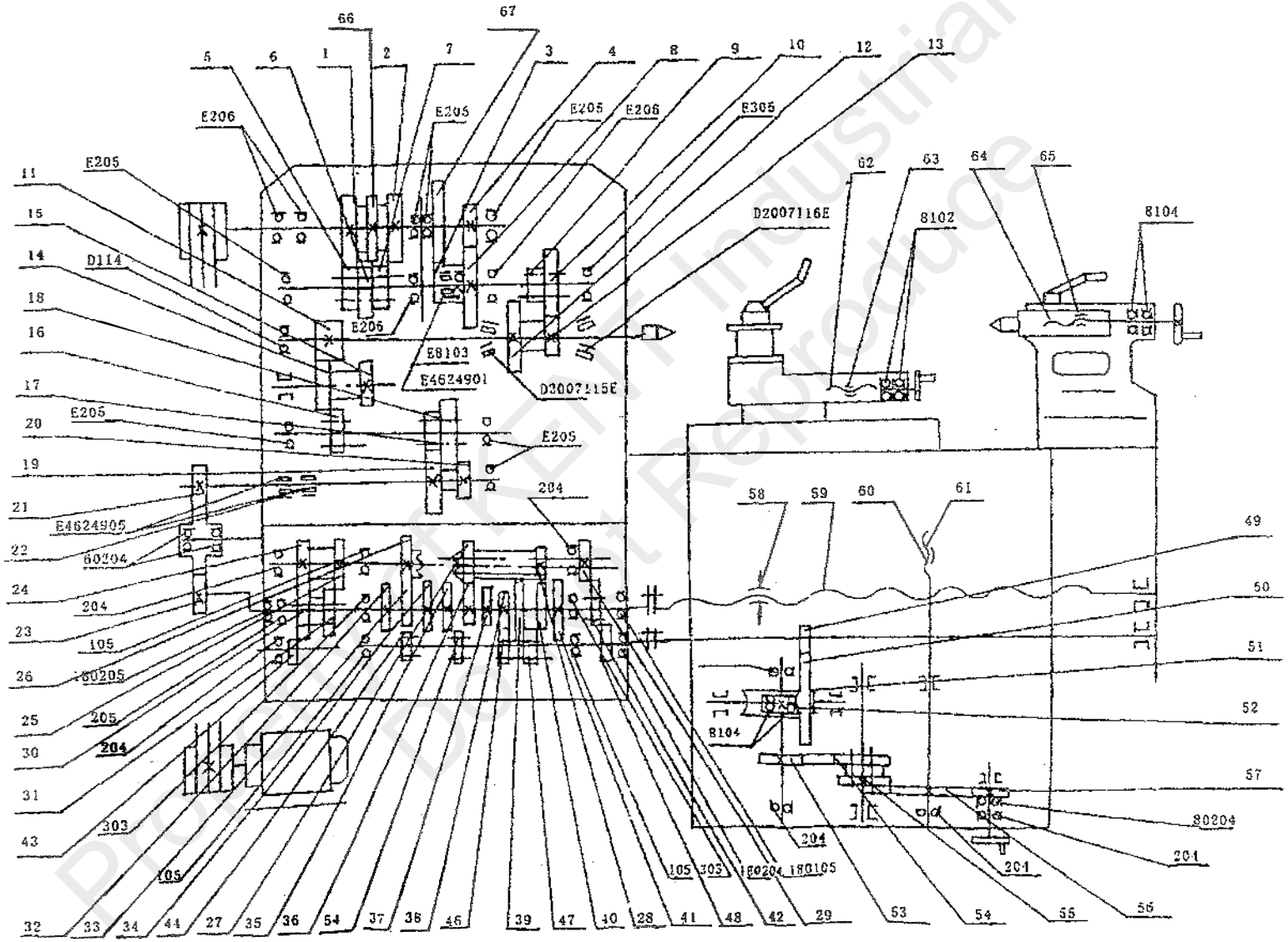


Figure 17.(b) Drive System and Bearing Distribution Diagram (for k1s1$\frac{8}{6}$ 40D)

Part Name	Headstock									
Figure No.	1	2	3	4	5	6	7	8	9	10
Part No.	020035	020036	020037	020038	020045	020046	020047	020048	020040	020041
Number of teeth or leads	43	37	18	30	29	35	54	42	54	19
Module or pitch	2.5									
Shift factor or rotation direction										
Helix angle or profile angle	20°									
Material	45									
Heat treatment	G52									

Part Name	Headstock									
Figure No.	11	12	13	14	15	16	17	18	19	20
Part No.	020049	020008	020006	020054		020016	020011	020012	020015	020014
Number of teeth or leads	38	40	75	26	26	38	19	38	38	19
Module or pitch	2.5									
Shift factor or rotation direction										
Helix angle or profile angle	20°									
Material	45									
Heat treatment	G52									

Part Name	Change gears (Inch)					Feeding box				
Figure No.	21		22	23		24	25	26	27	28
Part No.	080009	080010	080013	080014	080015	070033		070039	070044	
Number of teeth or leads	24	41	64	57	31	19	25	38	23	19
Module or pitch	2/2.25					3	2.5	2	2.5	2
Shift factor or rotation direction						1		0.86	0.13	0.88
Helix angle or profile angle	20°					20°				
Material	45					45				
Heat treatment						G48		G42		

Part Name	Feeding box									
Figure No.	29	30	31	32	33	34	35	36	37	38
Part No.	070050	070031		070037	070040	070041	070042	070043	070045	070046
Number of teeth or leads	35	19	20	22	19	20	24	23	27	24
Module or pitch	1.75	3	2.5	2.75	2	2.75	2.5	2.5	2	2
Shift factor or rotation direction	-0.45	0.16	0.86	-0.33	0.86	0.76	0.33	1	-0.73	1

Helix angle or profile angle	20°									
Material	45									
Heat treatment	G42									
Part Name	Feeding box									
Figure No.	39	40	41	42	43	44	45	46	47	48
Part No.	070047	070048	070049	070052	070026	070075	070074	070072	070072	070057
Number of teeth or leads	28	26	38	35	22	22	22	33	22	36
Module or pitch	2.5	2.5	2	1.75	3	2.75	2.5	2	2.5	1.75
Shift factor or rotation direction	-0.36	0.5	0.85	-0.045	-0.6	0.16	0.8	0.73	-0.5	-0.58
Helix angle or profile angle	20°									
Material	45									
Heat treatment	G42									
Part Name	Apron									
Figure No.	49	50	51	52	53	54	55	56	57	58
Part No.	060053	060052	060060	060052	060059	060064		060080	060074	060048
Number of teeth or leads	24	28	28	1	28	45	22	80	17	1
Module or pitch	2	2	3	3	1.75					6.35
Shift factor or rotation direction	0.3	-0.3		Right						
Helix angle or profile angle	20°									
Material	40Cr		ZcuSn10Pb1	40Cr				45		ZcuSn10Pb1
Heat treatment	G42			G42		G48				
Part Name		Carriage		Toolpost		Tailstock				
Figure No.	59	60	61	62	63	64	65			
Part No.	010012	050010	050011	050007	050006	030019	030021			
Number of teeth or leads	1									
Module or pitch	6.35	5		4		5				
Shift factor or rotation direction		Left		Right		Left				
Helix angle or profile angle										
Material	Y40Mn	ZcuSn10Pb1	Y40Mn	Y40Mn	ZcuSn10Pb1	Y40Mn	ZcuSn10Pb1			
Heat treatment										
Part Name	Metric change gears for kls-1800 and kls-8 lathes									
Figure No.	21			22				23		

Part No.	080009	080010	080013/ 080013-1		080013/ 080013-2	080014	080015
Number of teeth or leads	28/35	56	55	64/80	55/66	50	40
Module or pitch	2						
Shift factor or rotation direction							
Helix angle or profile angle	20°						
Material	45						
Heat treatment							

The following parts are for kls-1640D only. The other parts are the same with that of KLS-1640 except the following ones.

Part Name	Headstock									
Figure No.	1	2	3	4	5	6	7	8	9	10
Part No.	020021	020019	020028	020014	020029	020030	020031	020013	020011	020010
Number of teeth or leads	44	40	17	17	27	40	31	54/17	29	54
Module or pitch	2.5									
Shift factor or rotation direction										
Helix angle or profile angle	20°									
Material	45									
Heat treatment	G52									

Part Name	Headstock				
Figure No.	12	13	66	67	
Part No.	020006	020004	020021	020015	
Number of teeth or leads	68	43	31	54	
Module or pitch	2.5				
Shift factor or rotation direction					
Helix angle or profile angle	20°				
Material	45				
Heat treatment	G52				

The following parts are for kls-1840D/B series lathes only. The other parts are the same with that of BJ1640 except the following ones.

Part Name	Headstock									
Figure No.	1	2	5	6	7	9	10	11	12	13
Part No.	020016	020014	020017	020018	020019	020011	020012	020020	020010	020005
Number of teeth or leads	40	31	31	45	40	54	29	44	43	68
Module or pitch	2.5					3		2.5	3	
Shift factor or rotation direction	0									

Helix angle or profile angle	20°									
Material	45							40Cr		
Heat treatment	G52							D0.25		
Part Name	Headstock									
Figure No.	16	17	18	19	20	66				
Part No.	020027	020030	020029	020028	020030	020015				
Number of teeth or leads	22	22	44	44	22	26				
Module or pitch	2.5									
Shift factor or rotation direction	0									
Helix angle or profile angle	20°									
Material	45									
Heat treatment	G52									

8 Machine electrical system

This series machine has different kinds of power voltages and frequency that can be selected by customers when placing orders in order to meet the needs of customers.

The voltage of this machine's power net is permitted to fluctuate within ±10%, and the frequency of power net is allowed to change within 50Hz±1Hz or 60Hz±1Hz.

Machine suitable for 220V/440V are set before shipment in accordance with 220V only. Some adjustments must be made per relevant instructions in OPERATION MANUAL. Contact the manufacturer when necessary.

The machine power line is drawn into the terminal block on the rear of left side of the bed. When close customer power supply, the machine working lamp EL1 will be turned on.

Turn knob switch SA1 clockwise, the electrical system contact circuit turns on, the pilot lamp HL1 lights.

Push down the knob SB2, it will realize the spindle forward rotating and jogging.

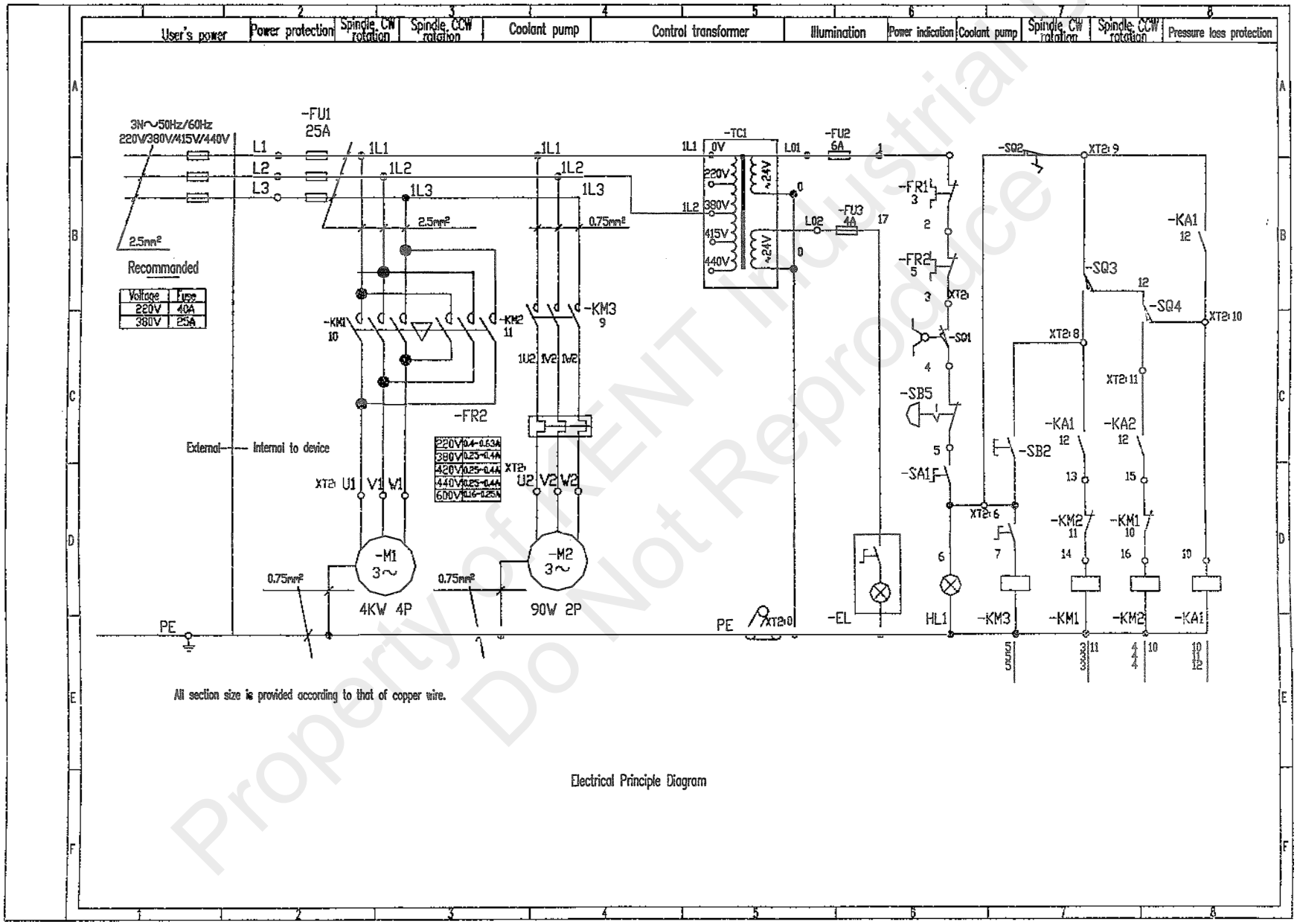
Turn the switch SA2 clockwise; the cooling pump starts to work.

Lift the switch lever, spindle rotates backward; press the switch lever downward, spindle rotates forward.

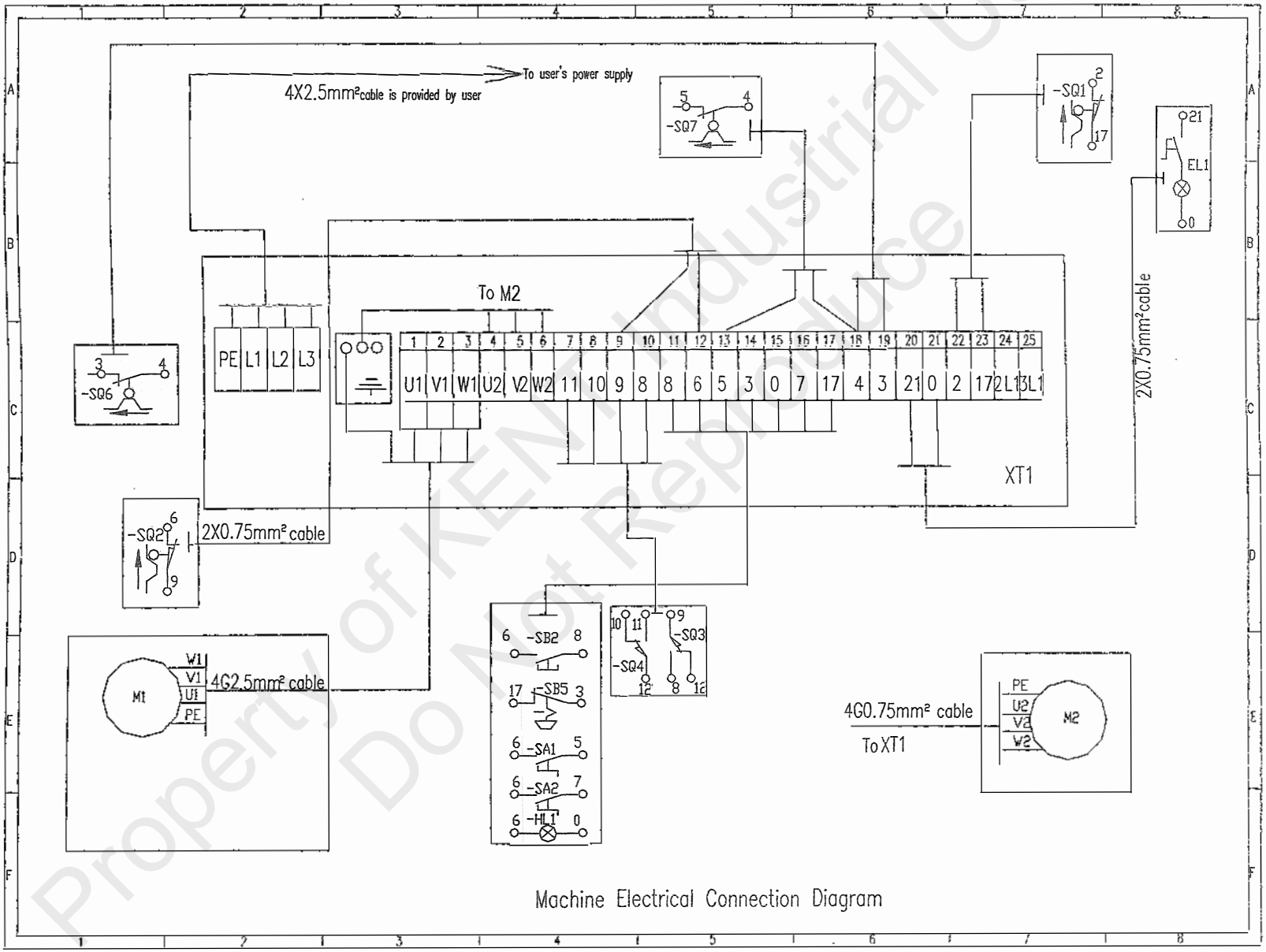
When trampling on brake pedal, at first the trip switch SQ2 is pressed, the spindle motor M1 is turned off realizing the spindle brake automatically.

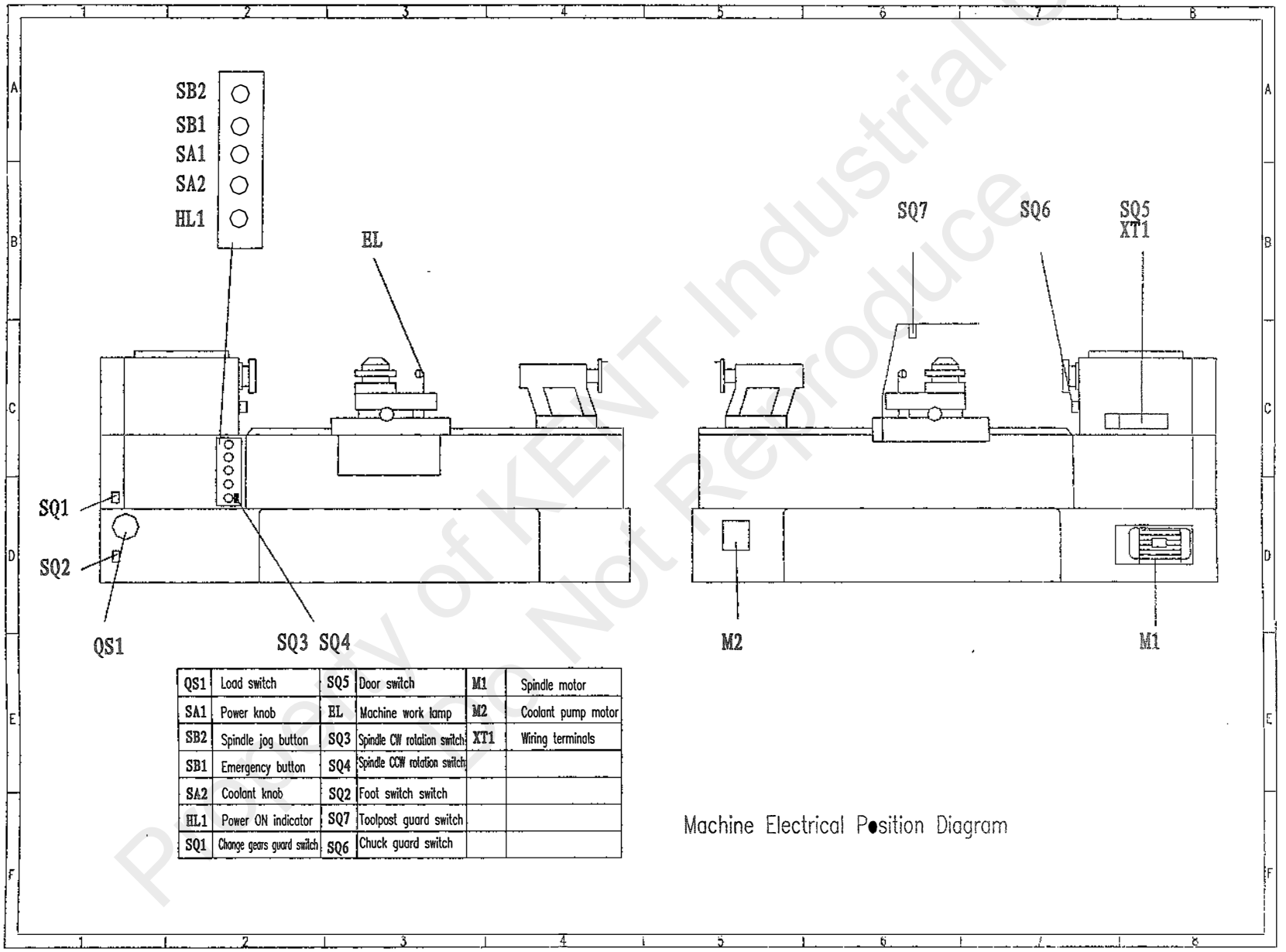
When it is needed to open the change gears cover for maintaining or adjusting machine. The trip switch SQ1 is released to make the electrical control circuit off, the spindle and the cooling pump stop so as to guarantee safety.

Emergency stop push button SB1 is pressed downward to stop the machine emergently so as to guarantee safe operation. Turn the "mushroom-shaped" head of SB2 clockwise, the SB2 is released, then the machine can be re-started to operate.



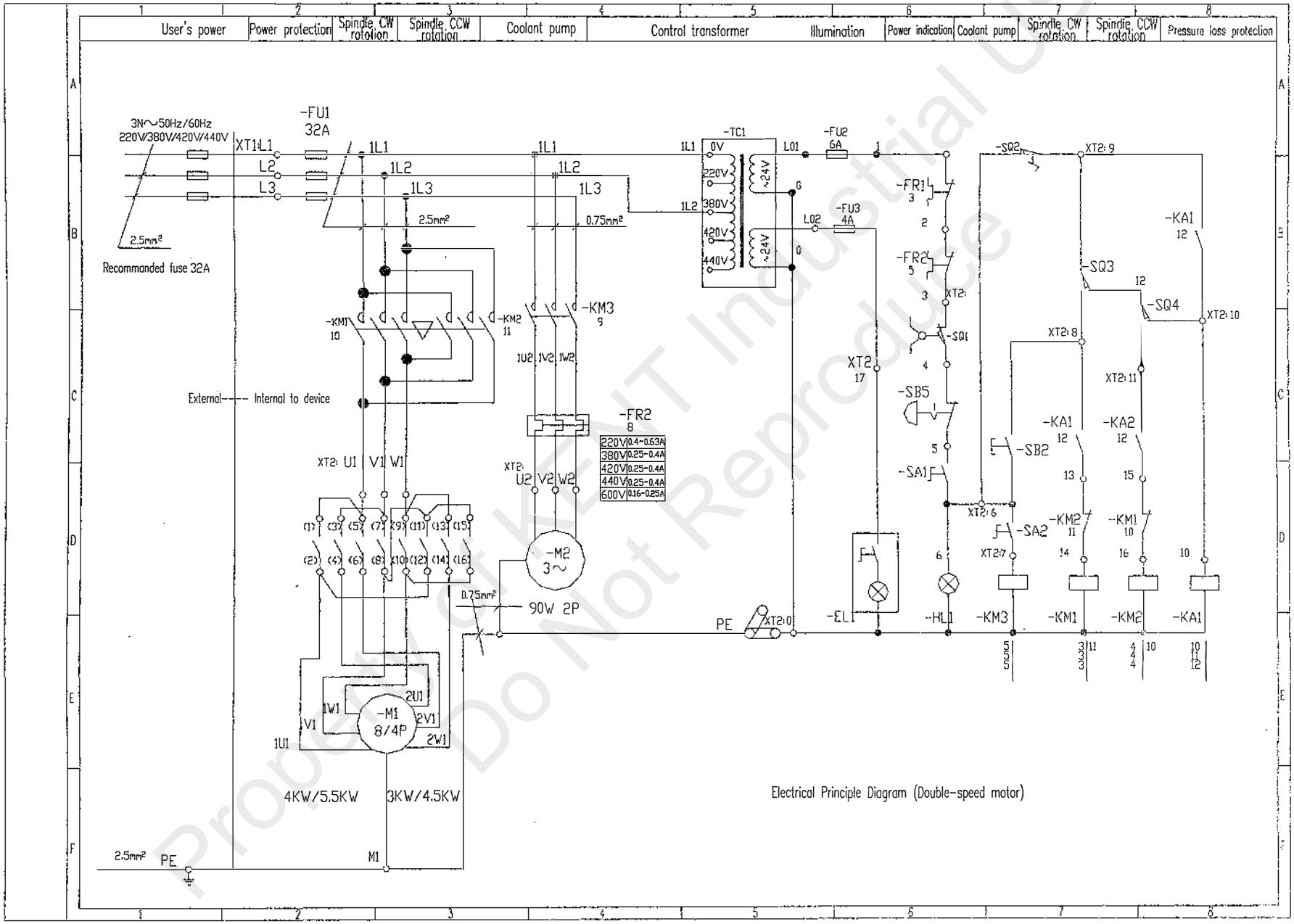
Electrical Principle Diagram

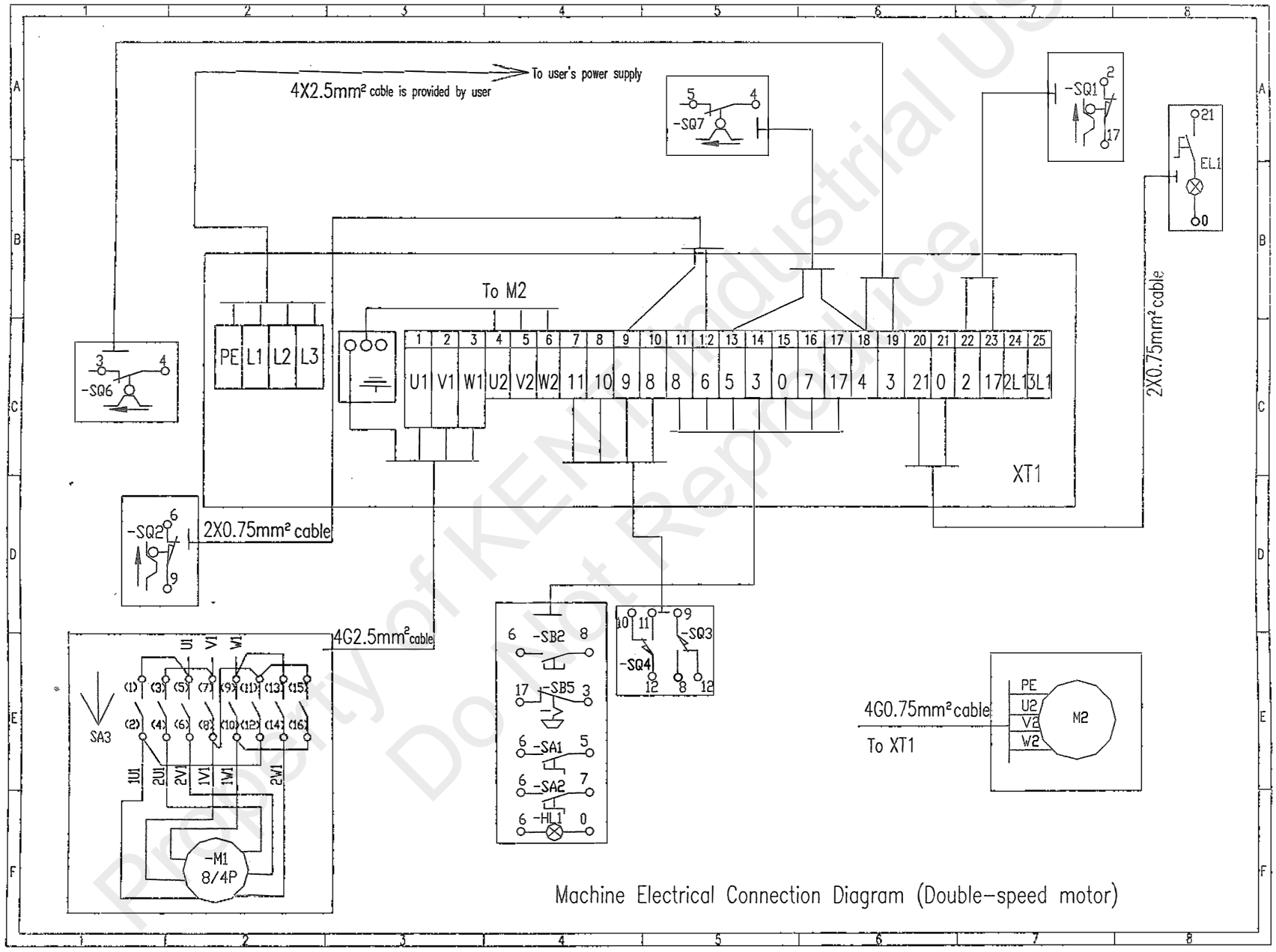


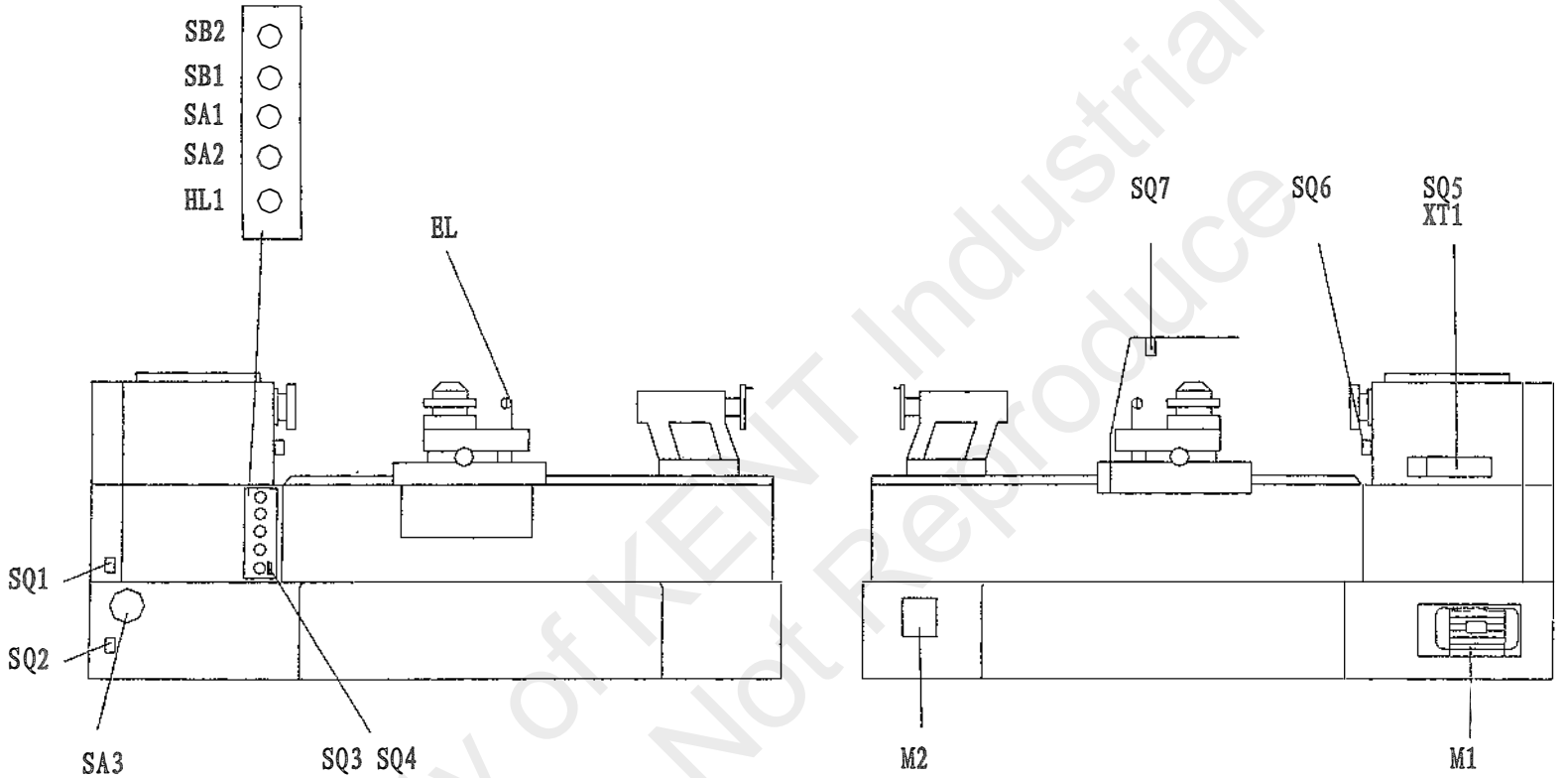


QS1	Load switch	SQ5	Door switch	M1	Spindle motor
SA1	Power knob	EL	Machine work lamp	M2	Coolant pump motor
SB2	Spindle jog button	SQ3	Spindle CW rotation switch	XT1	Wiring terminals
SB1	Emergency button	SQ4	Spindle CCW rotation switch		
SA2	Coolant knob	SQ2	Foot switch switch		
HL1	Power ON indicator	SQ7	Toolpost guard switch		
SQ1	Change gears guard switch	SQ6	Chuck guard switch		

Machine Electrical Position Diagram







SA3	Combination switch	SQ5	Door switch	M1	Spindle motor
SA1	Power knob	EL	Machine work lamp	M2	Coolant pump motor
SB2	Spindle jog button	SQ3	Spindle CW rotation switch	XT1	Wiring terminals
SB1	Emergency button	SQ4	Spindle CCW rotation switch		
SA2	Coolant knob	SQ2	Foot switch switch		
HL1	Power ON indicator	SQ7	Toolpost guard switch		
SQ1	Change gears guard switch	SQ6	Chuck guard switch		

Machine Electrical Position Diagram (Double-speed motor)

List of Electrical Appliances

Type	Name	Specifications	Qty.	Fig. Id.	Remarks
Y112M-4	3-phase asynchronous motor	4kW 50/60Hz 220V 380V 420V 440V 600V	1	M1	For KLS Y132M-4/7.5
AYB-25	3-phase pump	90W 50/60Hz 220V 380V 420V 440V 600V	1	M2	Special order: YC-125 1/8HP
JBK4-160	Transformer	50/60Hz 220V 380V 420V 440V 600V/24V 24V	1	TC	
XDY1-N/35	Signal lamp	AC24V	1	HL1	
LAY3-01ZS/1	Button		1	SB1	
LAY3-10			1	SB2	
LAY3-10X/22			1	SA1	
LAY3-10X/22			1	SA2	
LXW6-11ZL	Limit switch			SQ1	One LXW6-11CL for BJ50
LXW6-11ZL			1	SQ2	
LXW6-11DL			1	SQ3	
LXW6-11DL			1	SQ4	
HH54P-L	AC mediate relay	AC24V 50/60Hz	1	KA1	
CJX4-169B	A.C. contactor	380V 420V 440V 600V AC24V 50/60Hz	2	KM1、2	
CJX4-093B			1	KM3	
JRS4-09303d	Thermal relay	380V 420V 440V 600V: JRS4-09302d	1	FR2	
RT18-32A	Fuse	Fuse core: 25A	3	FU1	Double-speed :32A
RT23-16		Fuse core: 4A	1	FU3	
		6A	1	FU2	
YD132M-8/4	3-phase asynchronous double-speed motor	3kW / 4.5kW 4kW / 5.5 kW 时: YD132M-6/4 220V 380V 420V 440V 600V	1	M1	50/60Hz
Hz5-40/7.5M08	Combined switch		1	SA3	For double-speed motor

9 Taper turning attachment

9.1 Main application and use range

This attachment is used to cut conical surfaces and taper-pipe threads. As a special attachment to KLS series, it only fits the lathes produced by our works.

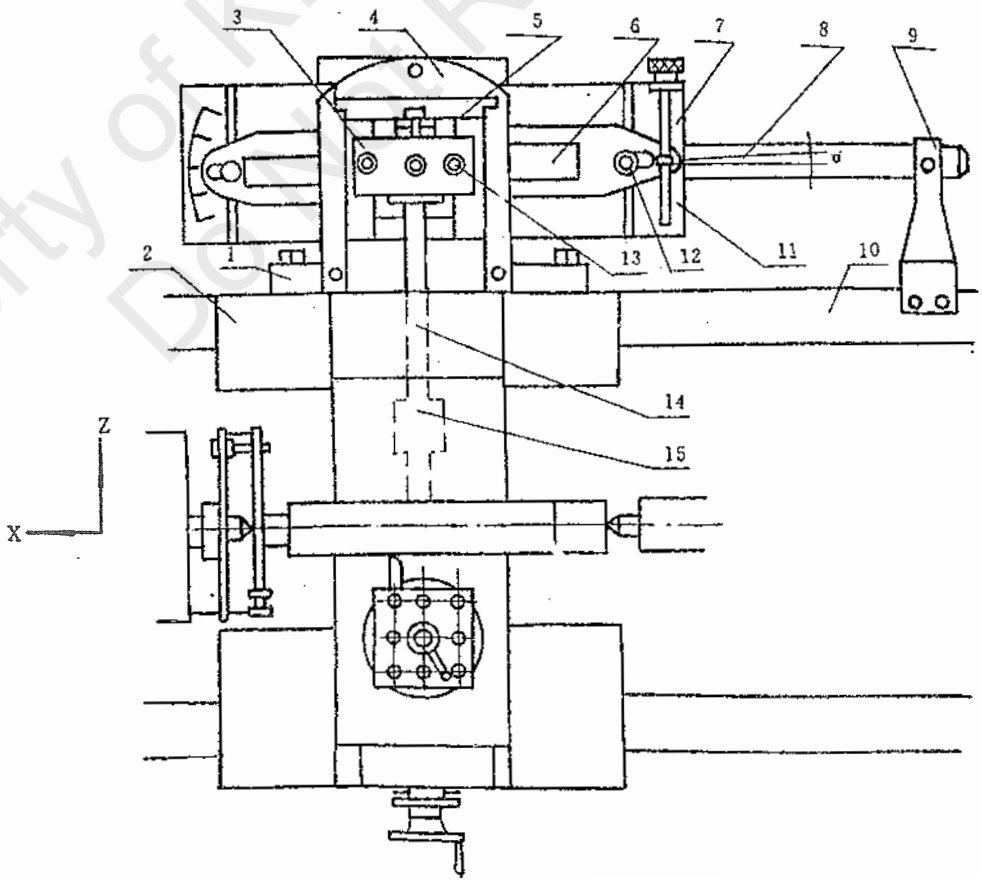
9.2 Main specifications

Max. machining length of work 150mm

Swivel angle $\pm 10^{o}$

Max. travel 20mm

9.3 Structure (see the following diagram)



As illustrated in the diagram, this attachment is fixed w g ith one end on bed (10) by support (9) and support arm (8), the other on back side of saddle (2) by 2-M6 screw and 2-10 taper pin. The "I" shaped sliding block (3) moves along sliding board (4), while slideway (5) slides along that part of the attachment (6). (7) is a scale plate on which the part (6) is fixed by a taper pin.

Adjustment and usage

The attachment can swing on the scale plate, taking the pin as its supporting point. Adjust the regulating lever till part (6) points to the angle required by the workpiece to be machined. Then fasten it with two T screws.

As soon as the tool carrier starts to move along the bed, that is, in X direction, it starts the lateral moving also (in Z direction). When the apron travels along the bed together with the saddle, slideway (5) will push along X, Z direction with the help of nut. The machine starts to cut a conical surface. When the machine cuts a taper workpiece, the operator must make a try cutting to measure the length of the cylindrical make by the mechanical backlash (the length of the cylindrical varies with the taper of workpiece). In normal cutting, the saddle moves to the right of the above cylindrical length by rotating the handwheel of the apron after setting tools. The machine can finish a taper as required.

9.5 Point for attention

Where the attachment is not being in use, release it soon. Take off the support arm (8). Point part (6) to "0" on the scale and fasten the screw (12). Look up the "I" shaped sliding block with screws (13) so as to stop the lead screw (14) from moving backward and forward. After all, the machine can be used as a normal lathe again.

Unload the attachment whenever begin to check or repair the machine's electrical system.

To ensure it run well and to reduce the wear on parts, the attachment needs oiling in all friction surfaces every four-operation hour by oil gun.