PALMGREN®

12″ x 36″ VARIABLE SPEED LATHE

Read carefully and follow all safety rules and operating instructions before first use of this product.

9646957.01-0121

GETTING STARTED

Please save this manual, along with a copy of your invoice for your records.

STRUCTURAL REQUIREMENTS

Make sure all supporting structures and load attaching devices are strong enough to hold your intended loads. If in doubt, consult a qualified structural engineer.

TOOLS NEEDED:

Standard mechanic's hand tool set.

UNPACKING

UNPACK

After removing the attachments and contents of the crate, remove the packing materials from the Lathe. Also check for any damage or missing parts from the lathe. If any damage is found or if any parts are missing, contact the carrier immediately to file a claim.

INSPECT:

- After unpacking the unit, carefully inspect for any damage that may have occurred during transit. Check for loose, missing or damaged parts. Shipping damage claims must be filed with the carrier.
- All tools should be visually inspected before use, in addition to regular periodic maintenance inspections.

CONTENTS

Contents of the crate should be removed individually and checked for any damage or missing parts. If damage is found or there are missing parts, please contact and file a claim with the carrier immediately.

- Follow Rest (1)
- Chuck Guard (1)
- Toolpost Guard (1)
- Work Lamp (1)
- Digital Readout (1)
- 4 Jaw Chuck (1)
- MT3 Live Center (1)

SAFETY RULES

- Read and understand the lathe manual before operation.
- Read and understand the warnings posted on the machine. Failure to comply with all of these warnings may cause serious injury.
- This lathe is designed and intended for use by properly trained and experienced personnel only. If you are not familiar with the proper and safe operation of a lathe, do not use until proper training and knowledge have been obtained.

SAFETY RULES (CONTINUED)

- Do not use this lathe for other than its intended use. If used for other purposes, PALMGREN, disclaims any real or implied warranty and holds itself harmless from any injury that may result from that use.
- Always wear approved safety glasses/face shields while using this lathe.
- Before operating this lathe, remove tie, rings, watches and other jewelry, and roll sleeves up past the elbows. Don't wear loose clothing and confine long hair. Non-slip footwear or anti-skid floor strips are recommended. Do not wear gloves.
- Do not operate this machine while tired or under the influence of drugs, alcohol or any medication.
- Make certain the switch is in the OFF position before connecting the machine to the power supply.
- Make certain the machine is properly grounded.
- Make all machine adjustments or maintenance with the machine unplugged from the power source.
- Remove adjusting keys and wrenches before turning it on.
- Keep safety guards in place at all times when the machine is in use.
- Check damaged parts. Before further use of the machine, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.
- Keep the floor around the machine clean and free of scrap material, oil and grease.
- Keep visitors a safe distance from the work area. Keep children away.
- Give your work undivided attention. Looking around, carrying on a conversation and "horse-play" are careless acts that can result in serious injury.
- Maintain a balanced stance at all times so that you do not fall or lean against moving parts.
- Do not operate the lathe in flammable or explosive environments. Do not use in a damp environment or expose to rain.
- Use the right tool at the correct speed and feed rate. The right tool will do the job better and more safely.
- Maintain tools with care. Keep cutting tools sharp and clean for the best and safest performance. Follow instructions for lubricating and changing accessories.
- Do not attempt to adjust or remove tools during operation. Turn off the power before servicing; when changing accessories, such as blades, bits, cutters, and the like.
- Never stop a rotating chuck or workpiece with your hands.
- Choose a low spindle speed when working unbalanced workpieces, and for threading and tapping operations.
- Do not exceed the maximum speed of the workholding device.
- Do not exceed the clamping capacity of the chuck.
- Secure work. For safety and use of both hands, use clamps or a vise to hold work when practical.

SAFETY RULES (CONTINUED)

- Workpieces longer than 3 times the chucking diameter must be supported by the tailstock or a steady rest.
- Avoid small chuck diameters with large turning diameters.
- Avoid short chucking lengths and small chucking contact.
- Turn off power before cleaning. Use a brush to remove chips-do not use your hands.
- Do not stand on the machine. Serious injury could occur if the machine tips over.
- Never leave the machine running unattended. Turn the power off and do not leave the machine until moving parts come to a complete stop.
- Remove loose items and unnecessary work pieces from the area before starting the machine.
- Direction of feed – feed work into a blade or cutter against the direction of rotation of the blade or cutter only.
- Tighten all locks before operating.
- Rotate workpieces by hand before applying power.
- Rough out workpiece before installing on faceplate.
- Use lowest speed when starting new workpiece.

SPECIFICATIONS

Swing over bed	12 in
Swing over cross slide	7-5/16 in
Height of center	6 in
Distance between centers	36 in
Width of bedways	7-1/2 in
Total length of bed	60 in
Swing over gap	17-1/2 in
Length of gap	9-1/2 in
Width in front of gap	9-1/2 in
Face plate	6 in
Spindle nose mounting	D1-4 CAMLOCK
Spindle bore	1-9/16 in
Taper of spindle bore	MT5
Number of spindle speeds	Variable speed change
Range of spindle speeds	40 – 2000 RPM
Total travel of cross slide	6-3/4 in
Total travel of top slide	3-1/2 in
Max. size cutting tool	1/2 in
Total travel of tailstock barrel	4 in
Taper in barrel	MT3
Diameter of barrel	Dia. 1-9/16 in
Main spindle motor	2 HP; 1.47 kW
Coolant pump motor	1/8 HP; 0.1 kW

SPECIFICATIONS (CONTINUED)

Machine net weight ..... 1212 lb
Machine gross weight ..... 1474 lb
Leadscrew diameter & pitch ..... Pitch 4mm 8 TPI Dia. 22mm 7/8 in
Inch threads .....3-24 TPI (8Nos) for metric system
Inch threads .....2-56 TPI (34Nos) for inch system
Metric pitches ..... 0.5 – 10mm (21Nos) for metric system
Metric pitches ..... 0.5 – 12mm (33Nos) for inch system
Feed rod diameter ..... Dia. 3/4 in
Longitudinal feeds ..... 0.0016 – 0.0460 in/rev. (25) for inch system
Cross feeds ..... 0.0005 – 0.015 in/rev. for inch system

INSTALLATION

Use a sling-chain to lift the lathe (Figure 1) and position the saddle and tailstock along the bed to maintain balance. Raising and lowering the machine should be done carefully, especially when you lower the machine, be sure the machine does not strike the floor.

IMPORTANT: DO NOT USE SLINGS AROUND BED AS LEADSCREW AND FEEDSHAFT MAY BEND.

Install the machine on a solid foundation, allow sufficient area around for ease of work and maintenance. The lathe maybe used free-standing or bolted to the foundation.

Free-standing: Position lathe on foundation and adjust each of the six mounting feet to take equal share of the load. Then using a level on the bedways (as in Figure) adjust the

Fixed installation: Position lathe over six bolts (1/2 in. or 12 mm. dia.), set into the foundation to correspond with holes in the mounting feet. Accurately level the machine as in Figure, then tighten hold-down bolts and recheck bed level.

INSTALLATION (CONTINUED)

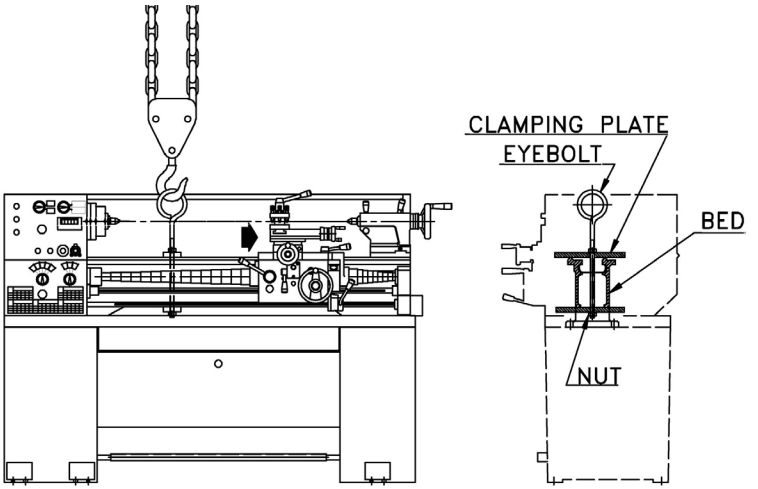


Figure 1 – Use sling-chain to lift.

CLEANING

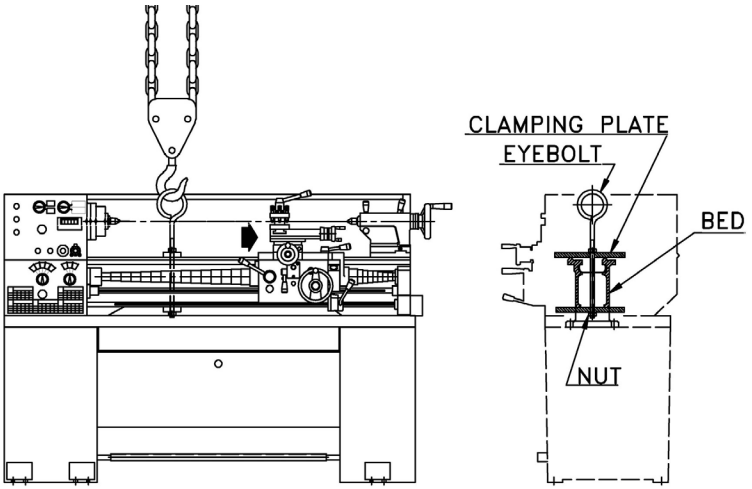


Figure 1 – Use sling-chain to lift.

Before operating the controls, use a white cleaning spirit or mineral spirits to remove the anticorrosion coating from all slideways and the end gear train.

DO NOT USE CELLULOSE SOLVENTS FOR CLEANING AS THEY WILL DAMAGE THE PAINT FINISH.

All machine surfaces require cleaning using machine oil or slideway lubricant. Use heavy oil or grease on the end gears.

OPERATION

ELECTRICAL CONTROLS

The main power switch is found on the front of Electrical box behind the lathe (head-end)

All electrical controls are found on the front face of the headstock and the top of Electrical box on the top of headstock.

(1) POWER ON BUTTON (RED): Push button to turn on the power, pilot lamp will light up. The machine is ready to be run.

(2) POWER OFF BUTTON (GREEN): Push to power off the machine. Pilot lamp will turn off.

(3) PILOT LAMP: When power is on, the pilot lamp glows.

(4) EMERGENCY STOP SWITCH: press the RED Emergency-stop button to cut electric power and stop the main motor and coolant pump.

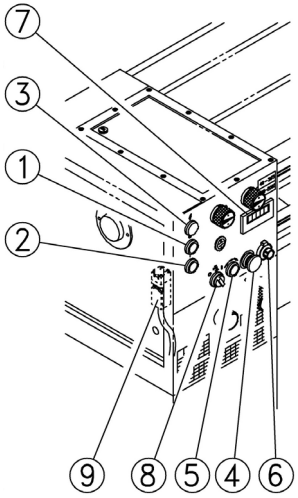


Figure 3 – Electrical controls.

OPERATION (CONTINUED)

(5) INCHING: Press the GREEN button to move spindle slightly, it will make spindle speed selection easier. (While the spindle rotation lever is set in the neutral position)

(6) VARIABLE SPEED SELECTORS: adjust spindle speed. If the operator opens the cabinet door for adjustment or maintenance, the machine will automatically stop all rotation.

MAIN MOTOR CONTROLS

A. Main motor rotation: Selected by the lever controls (located on right hand side of apron). Move lever out and upward to engage forward rotation of spindle, or out and down to engage reverse rotation, or return to the central position to disengage drive.

B: Foot brake: A foot pedal between plinths operates the spindle brake.

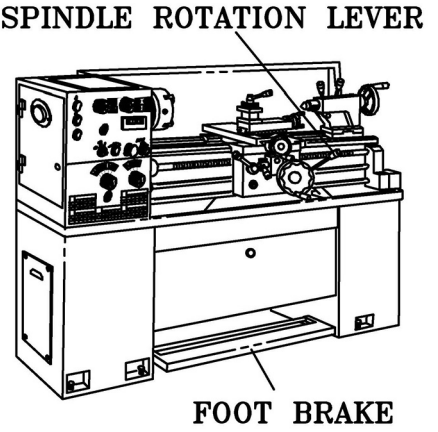


Figure 4 – Main motor controls.

SPINDLE SPEED SELECTORS

Variable spindle speed control is divided into two groups: High speed (218 - 2000 RPM) and lower speed (40 - 365 RPM).

First, set the upper right hand knob (A) on the headstock to the desired speed range.

WARNING: Do not change knob's position with spindle in motion. Spindle must be motionless when changing knob's position)

Then, adjust variable speed selectors (B) to desired spindle speed. Selectors (B) can change speed while spindle is rotating. Spindle speed chart (C) equipped on the face of the headstock shows the RPM while spindle rotating.

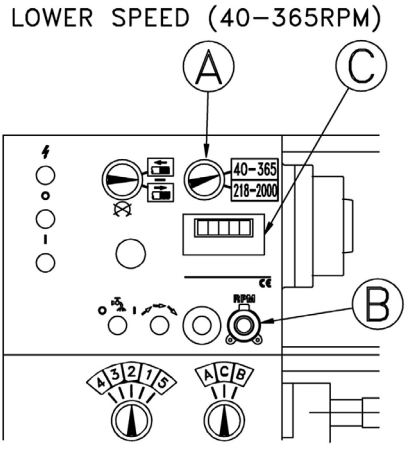


Figure 5 – Spindle speed selectors for lower speed range.

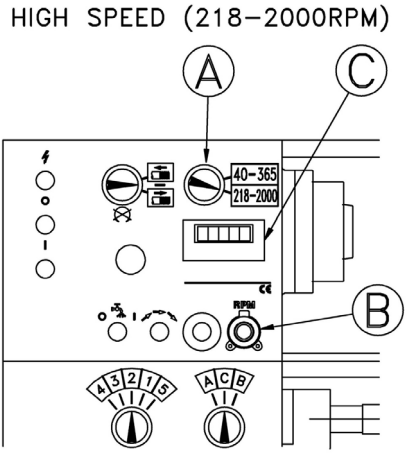


Figure 6 – Spindle speed selectors for high speed range.

OPERATION (CONTINUED)

THREADS AND FEEDS

All the threads and feeds directly available from the gearbox are shown on a data plate mounted on the front of the gearbox cover, near the control levers. Threads and feeds direction can be changed by forward/reverse knob on the headstock, and positioning control knobs and levers on the gearbox. The end gear train should be arranged as in the diagrams shown on the data plate to suit threading requirements. Loosen the clamping nut of swivel casting arm to exchange the transmission shaft gear with another gear, and to adjust clutching in screw cutting work as well as in feed work. Change of driven gear is made by loosening the 120T and 127T gear-shaft clamping nut. Suitable backlash is necessary to intermediate the gear in both cases.

NOTE: A limit switch is located at the lower right side. When the end cover is opened the machine will stop automatically.

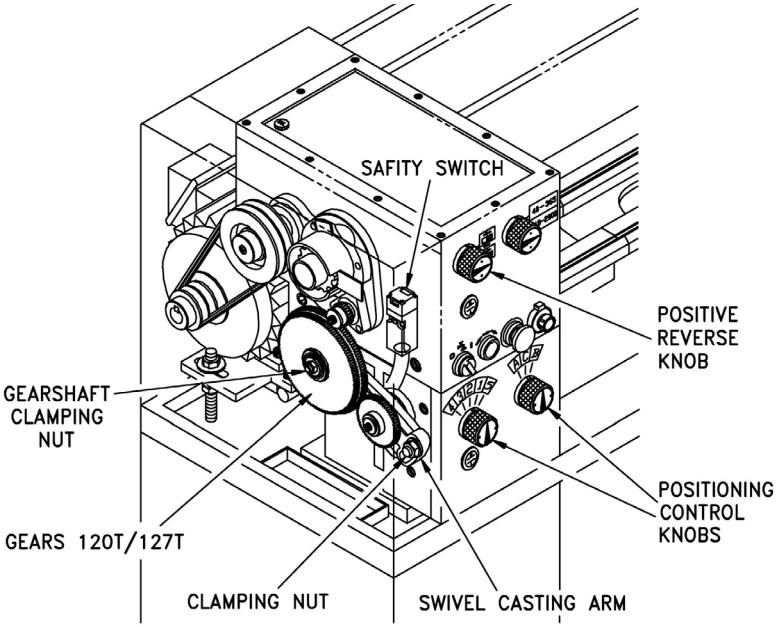
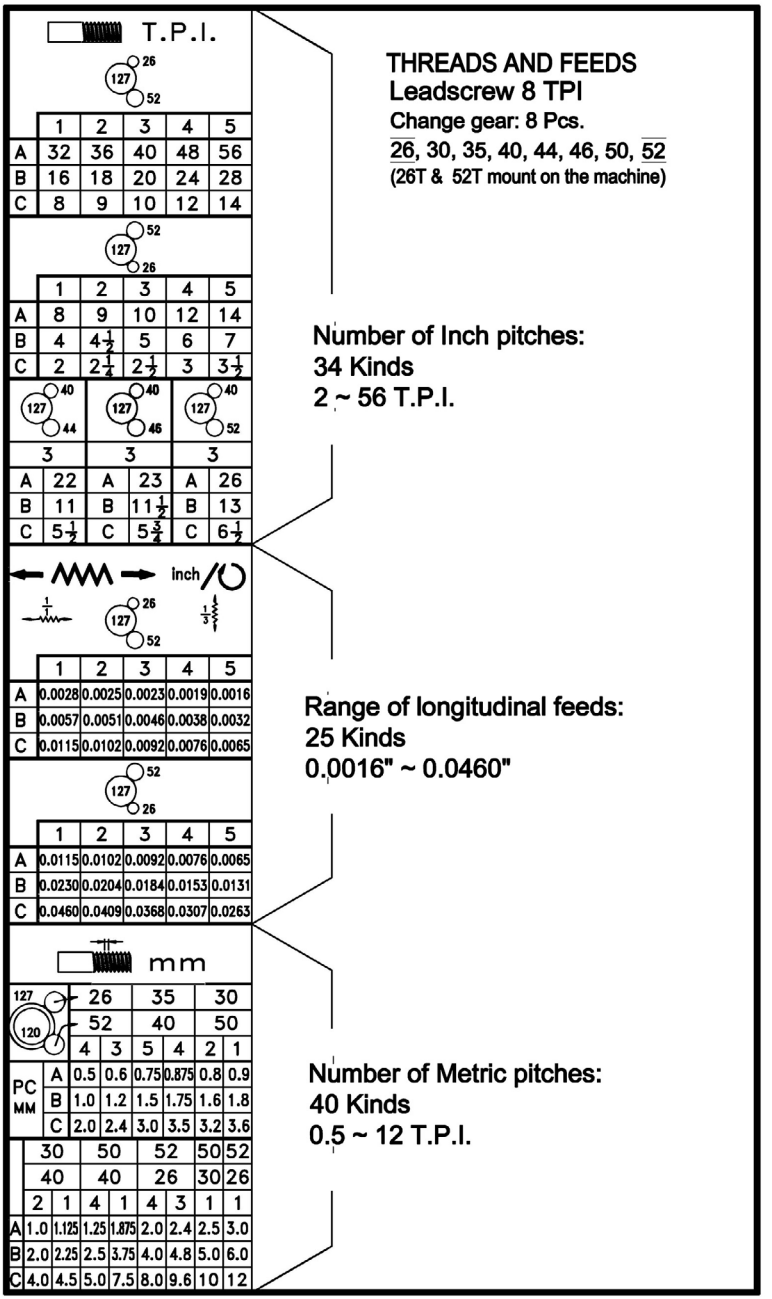


Figure 7 – Threads and feeds illustration.

OPERATION (CONTINUED)

THREADING DIAL INDICATOR



	1	2	3	4	5
A	32	36	40	48	56
B	16	18	20	24	28
C	8	9	10	12	14

	1	2	3	4	5
A	8	9	10	12	14
B	4	4 1/2	5	6	7
C	2	2 1/4	2 1/2	3	3 1/2

127 / 40 / 44		127 / 40 / 46		127 / 40 / 52	
3		3		3	
A	22	A	23	A	26
B	11	B	11 1/2	B	13
C	5 1/2	C	5 3/4	C	6 1/2

	1	2	3	4	5
A	0.0028	0.0025	0.0023	0.0019	0.0016
B	0.0057	0.0051	0.0046	0.0038	0.0032
C	0.0115	0.0102	0.0092	0.0076	0.0065

	1	2	3	4	5
A	0.0115	0.0102	0.0092	0.0076	0.0065
B	0.0230	0.0204	0.0184	0.0153	0.0131
C	0.0460	0.0409	0.0368	0.0307	0.0263

127 / 120		26		35		30	
		52		40		50	
		4	3	5	4	2	1
PC MM	A	0.5	0.6	0.75	0.875	0.8	0.9
	B	1.0	1.2	1.5	1.75	1.6	1.8
	C	2.0	2.4	3.0	3.5	3.2	3.6

	30		50		52		50	52
	40		40		26		30	26
	2	1	4	1	4	3	1	1
A	1.0	1.125	1.25	1.875	2.0	2.4	2.5	3.0
B	2.0	2.25	2.5	3.75	4.0	4.8	5.0	6.0
C	4.0	4.5	5.0	7.5	8.0	9.6	10	12

Figure 8 – Threads and feeds chart.

OPERATION (CONTINUED)

A. METRIC THREADS

The thread dial used for cutting metric screw threads on lathes equipped with metric leadscrew. To provide for the various pitches of metric threads, several gears having different numbers of teeth are mounted on the lower end of the shaft. The vertical position of the thread dial indicator is changed as required so that the correct gear for the pitch of the thread to be cut will mesh with the leadscrew.

Each graduation on the dial is marked with a letter which indicates the points at which the half-nuts may be engaged for certain threads. A diagram is supplied with the thread dial to show which gear and which graduations must be used for each pitch of metric screw thread.

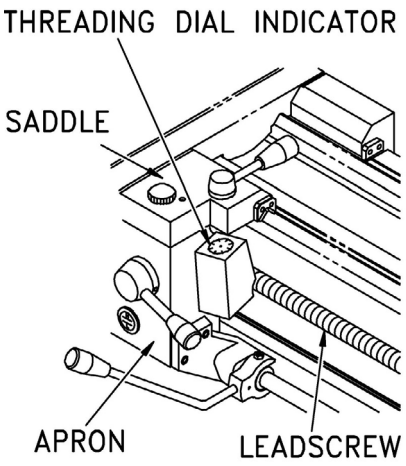
This dial cannot be used with a metric leadscrew to cut inch threads. For these the leadscrew nut must be kept closed and the machine reversed by use of the changeover switch, after each cutting pass and tool withdrawal.

B. WHITWORTH THREADS

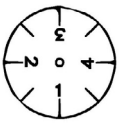
Located on right hand side of the apron on lathes having an English leadscrew. Engage the indicator pinion with the leadscrew and tighten the hand nut to retain indicator in engagement. To cut threads of an even number per inch, close the leadscrew nut as ANY line on the dial passes the datum mark. To cut threads of odd numbers per inch, close the leadscrew nut at any NUMBERED line.

Fractional threads of 1 /2 or 1 /4 TPI may be cut by closing the nut at the SAME numbered line on each pass of the tool.

This dial cannot be used with an English leadscrew to cut metric threads, or fractional threads. For these the leadscrew nut must be kept closed and the machine reversed by use of the changeover switch, after each cutting pass and tool withdrawal.



METRIC THREAD DIAL						
PC	T	↓	PC	T	↓	
0.4	20	4	1.4	21	3	
0.45	27	3	1.5	27	3	
0.5	20	4	1.625	26	2	
0.55	22	2	1.75	21	3	
0.6	27	3	2.0	20	4	
0.625	20	4	2.25	27	3	
0.65	26	2	2.5	20	4	
0.7	21	3	2.75	22	2	
0.75	27	3	3.0	27	3	
0.8	20	4	3.25	26	2	
0.875	21	3	3.5	21	3	
0.9	27	3	4.0	20	4	
1.0	20	4	4.5	27	3	
1.1	22	2	5.0	20	4	
1.125	27	3	5.5	22	2	
1.2	27	3	6.0	27	3	
1.25	20	4	6.5	26	2	
1.3	26	2	7.0	21	3	
1.375	22	2				
LEADSCREW PITCH 4MM						



WHITWORTH THREAD DIAL								
TPI	↓		TPI	↓		TPI	↓	
4	1–8		12	1–8		38	1–8	
4½	1–8 / 2–4		13	1–4		40	1–8	
4½	1		14	1–8		44	1–8	
5	1–4		16	1–8		48	1–8	
5½	1–8 / 2–4		18	1–8		52	1–8	
6	1–8		19	1–8		56	1–8	
6½	1–8 / 2–4		20	1–8		64	1–8	
7	1–4		22	1–8		72	1–8	
8	1–8		24	1–8		76	1–8	
9	1–4		26	1–8		80	1–8	
9½	1–8 / 2–4		28	1–8		88	1–8	
10	1–8		32	1–8		96	1–8	
11	1–4		36	1–8		104	1–8	
LEADSCREW PITCH 8T.P.I.								

Figure 9 – Threading dial indicator and charts.

MAINTENANCE

LATHE ALIGNMENT

With the lathe installed and running, we recommend a check on machine alignment before commencing work. Check levelling and machine alignment regularly to ensure continued lathe accuracy.

A. HEADSTOCK CHECK

Take a light cut with a keen tool over a 6 in. length of 2 in. dia. steel bar gripped in the chuck but not supported at the feed end. Micrometer readings at each end of the tubed length (at A and B) should be the same.

To correct a difference in readings, slacken the four headstock hold-down screws (S) and adjust the set-over pad (P) beneath the headstock, to pivot the headstock about the dowel (D). Tighten all screws after adjustment and repeat the test cut and micrometer reading sequence until micrometer readings are identical, so machine now cuts parallel.

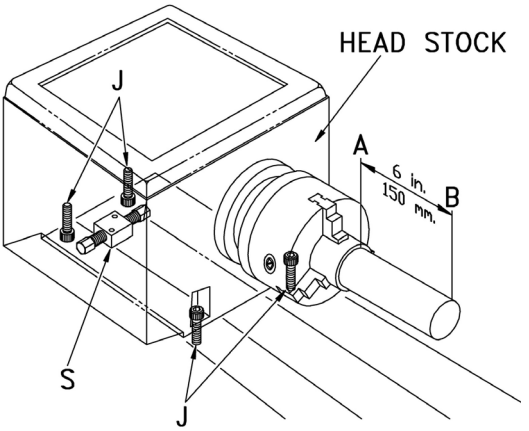


Figure 10 – Headstock illustration.

B. TAILSTOCK CHECK

Using a 12 in. (305mm.) ground steel bar fitted between headstock and tailstock centers, check the alignment by mounting a dial indicator to the topslide and traversing the center line of the bar.

To correct error, release the tailstock clamp lever and adjust the two set-over screws provided. Continue with checking and correction until the alignment is perfect.

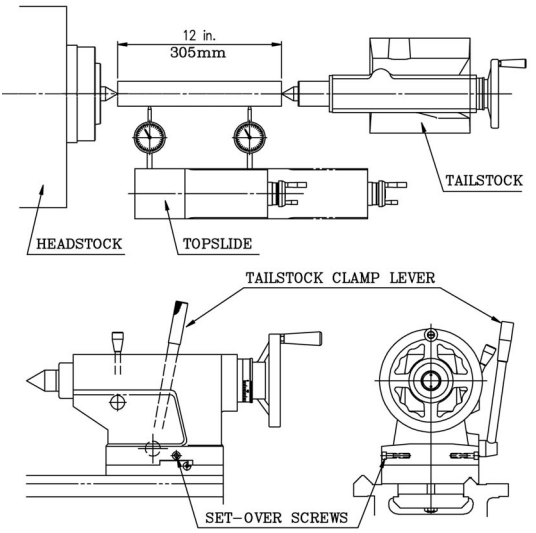


Figure 11 – Tailstock illustration.

MAINTENANCE (CONTINUED)

C. SLIDE WAYS ADJUSTMENT

Tapered gib strips fitted to slide-ways of saddle cross-slide and top-slide (compound) so that any slackness which may develop can be rectified.

Ensure that slideways are thoroughly cleaned and lubricated before attempting adjustment.

Then reset the gibs by slackening the rear gib screw and tightening the front screw, a little at a time. Check constantly for smooth action throughout full slide travel; avoid over-adjustment which can result in increased wear-rate and stiff or jerky action.

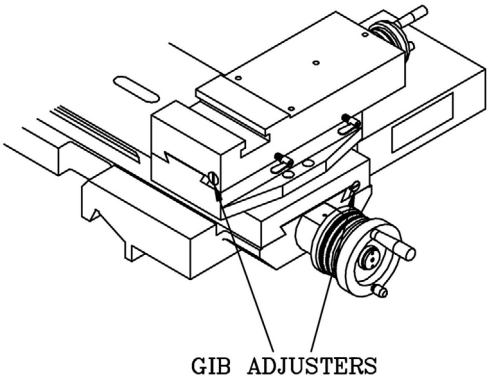


Figure 12 – Gib adjusters illustration.

D. CROSS-SLIDE NUT

This is adjustable for elimination of slackness which may develop in service. Reduce backlash with the cap-head screw on top of the cross-cover, then make only small adjustment by the cap-head screw. Before operating the cross-slide several times by hand, check for smooth operation throughout full travel.

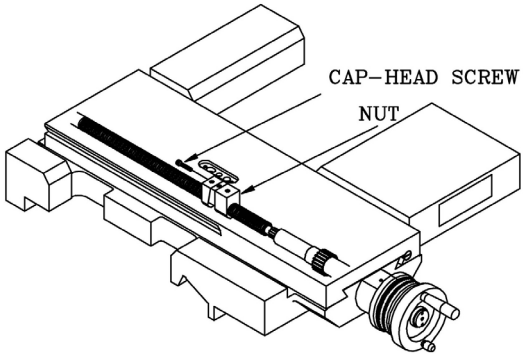


Figure 13 – Adjust cross-slide nut with cap-head screw.

E. LUBRICATION

Headstock bearing and gears are splash lubricated. Ensure that oil lever is kept between H-L lever mark on the sight glass in the front of headstock. Every day, check the lubrication oil. If unclean, drain the old, and refill with new oil.

To change oil in headstock, set apron control lever to central position and stop the main motor. Unscrew the drain plug beside headstock, then the oil tank can be easily drained out for changing oil. A filler plug is fitted beside the left end of headstock accessible after removal of the end guard.

The gearbox and apron are splash-lubricated from an internal reservoir of oil. Check the oil level constantly to the mark on the oil sight window at the right side face of the gear box; a weekly check is recommended, with the oil changed every year. Fill oil through a filler cap in the top of the gearbox, enclosed by the end guard. Drain from the drain plug in the bottom of the gearbox. The apron can be drained by unscrewing a hex-headed drain plug in the bottom.

MAINTENANCE (CONTINUED)

In addition, an oil gun is provided to oil the oiler points on the saddle, cross-slide, cross-slide nut and top-slide with light machine oil or Way Lubricant, see figure 15.

At each oiler point, check oil levels, but it is recommended to top up oil every day. It is recommended that all slideways, leadscrew and feed shaft are cleaned off (a bristle paint brush is useful for this) and lightly oiled after each period of work.

NOTE: Using incorrect grade of oil can cause damage.

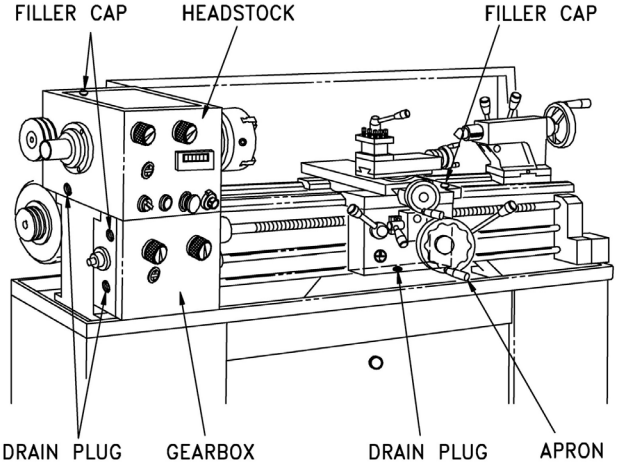


Figure 14 – Splash lubrication.

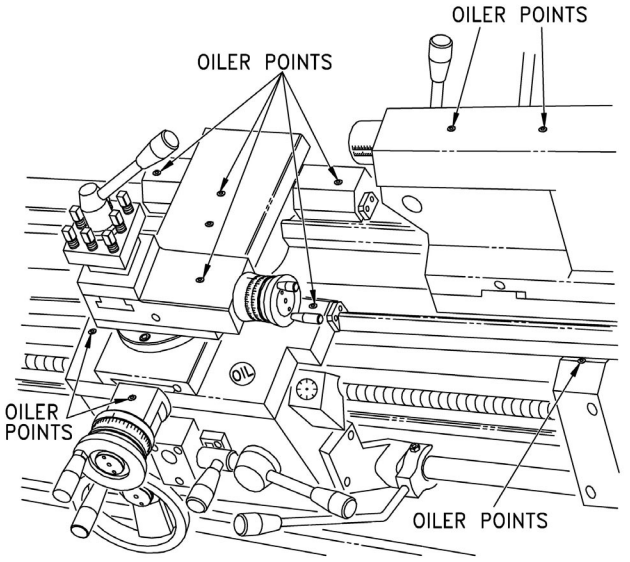


Figure 15 – Oiler points lubrication.

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
The power light is on, but the device does not work.	The electrical circuit is cut off by a limit switch.	Check if the brake switch is engaged, side safety door is not closed, or if the chuck guard is open.
The power light does not light up.	The electrical circuit is cut off.	Check if the E-stop button is engaged. Twist and pull to release.
Slow braking.	Brake shoes damaged.	Adjust the arm of the brake.
Cannot step on the brake pedal.	There is too much iron fillings around the pedal.	Clean debris away from pedal.
The brake does not work properly	The brake switch has failed.	Turn off the lathe and replace the brake switch.
Automatic feed is tripping or stuttering.	Abnormal operation.	Check the feed and speed values. Adjust the clutch found near the apron.

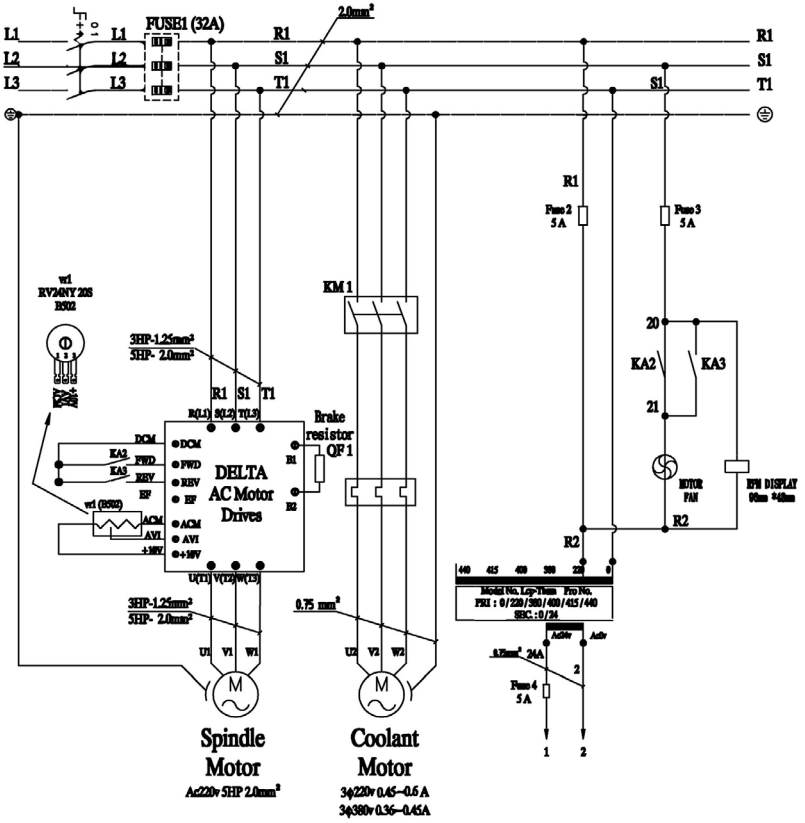


Figure 16 – Electrical diagram, 1 of 2.

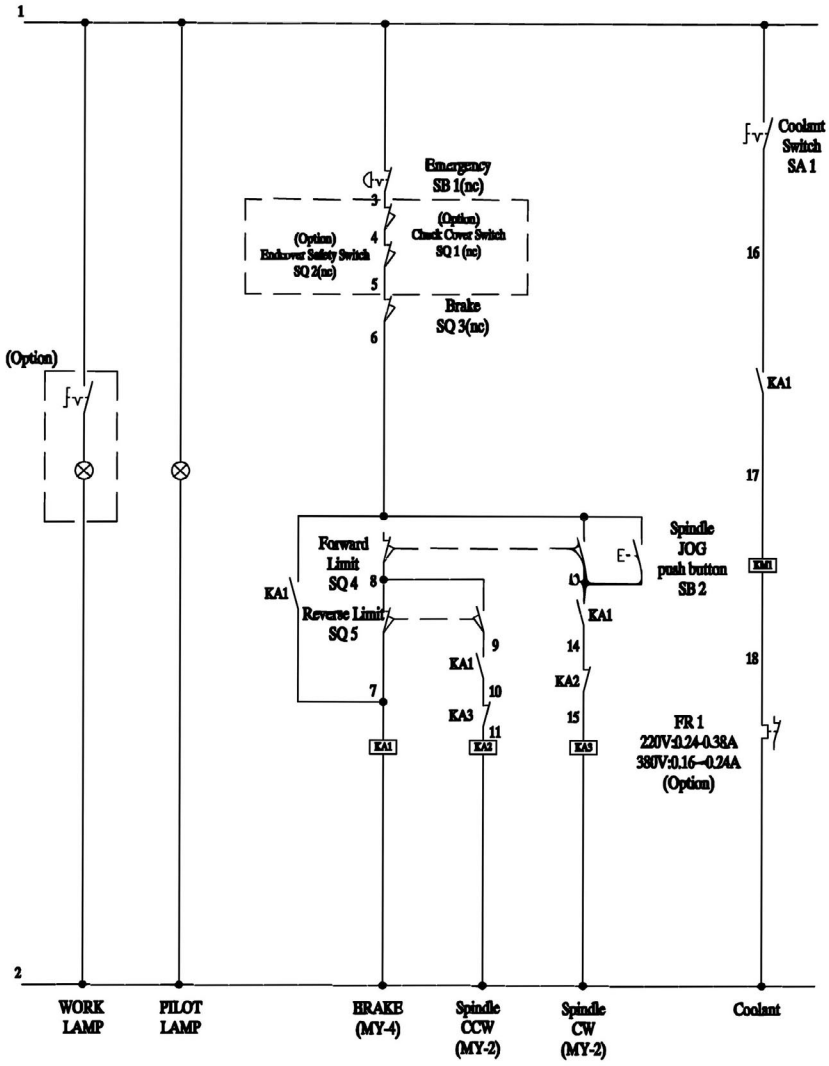
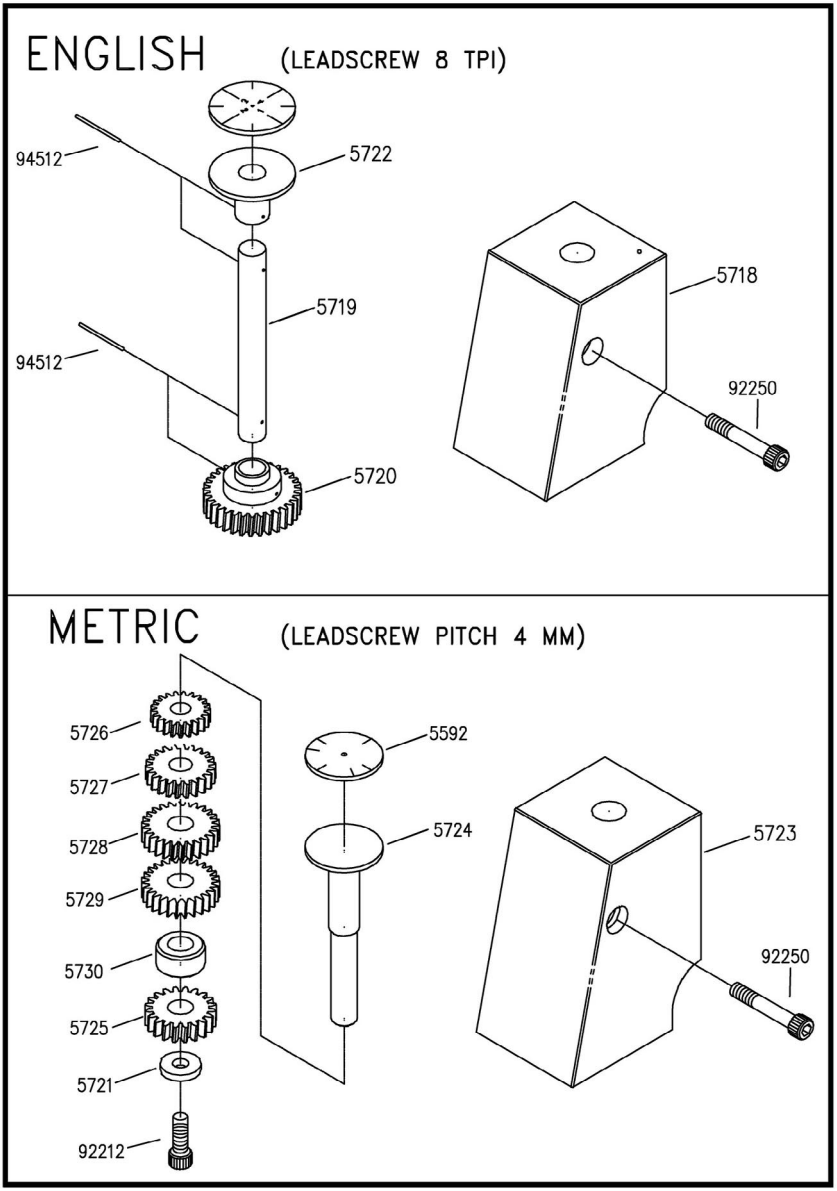
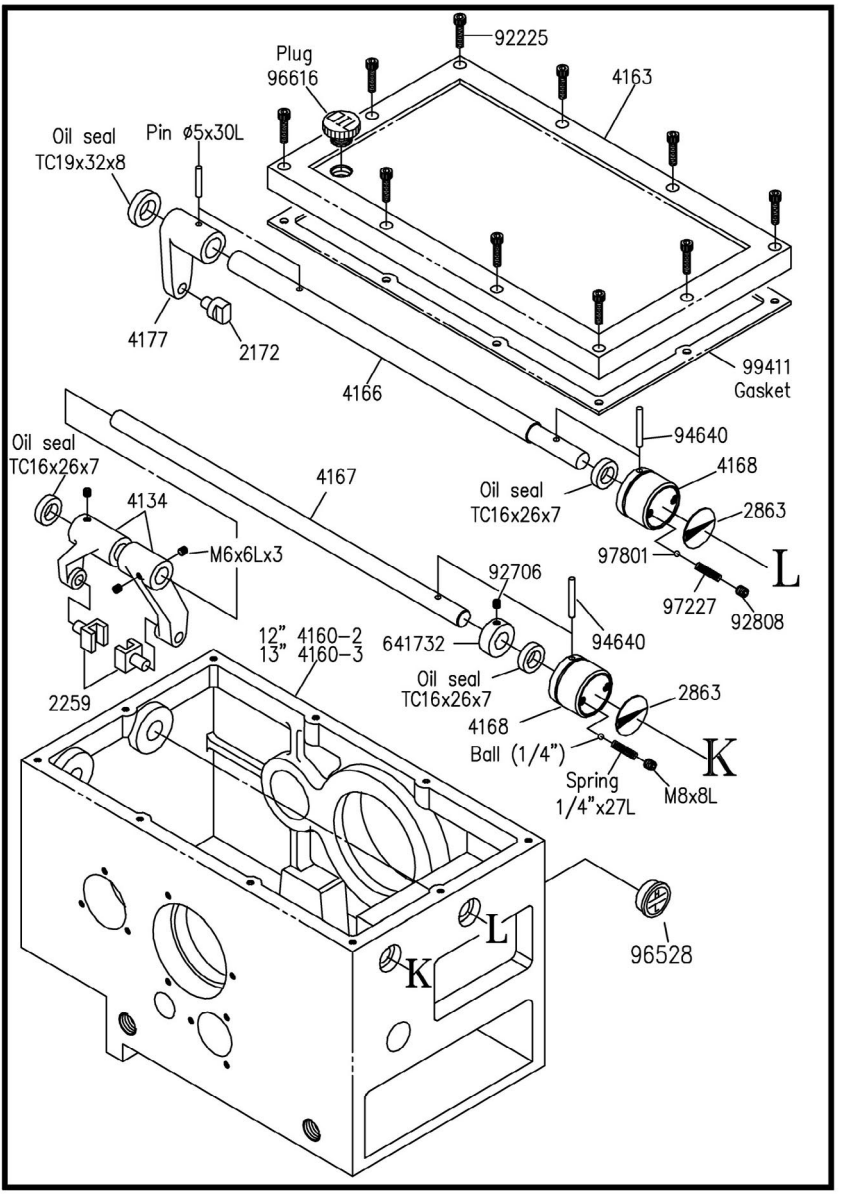


Figure 17 – Electrical diagram, 2 of 2

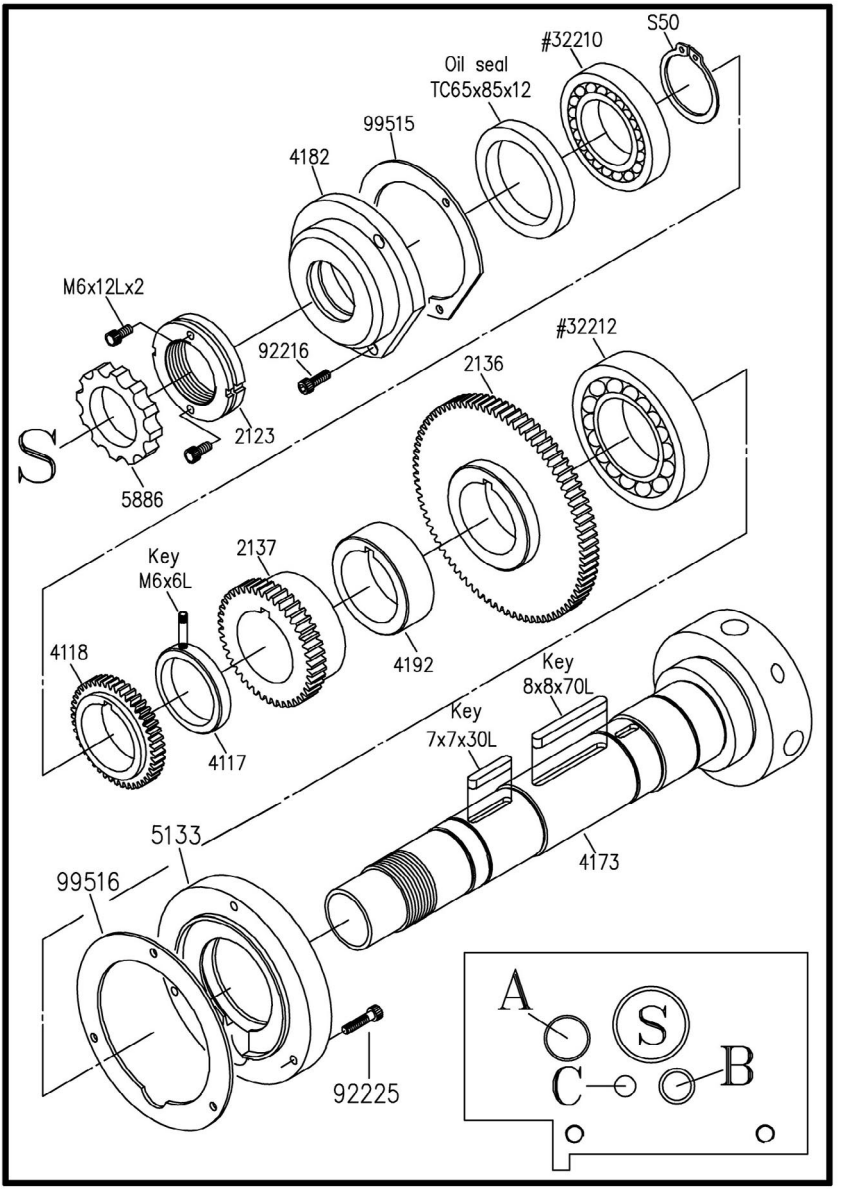
ASSEMBLY THREADING DAILS



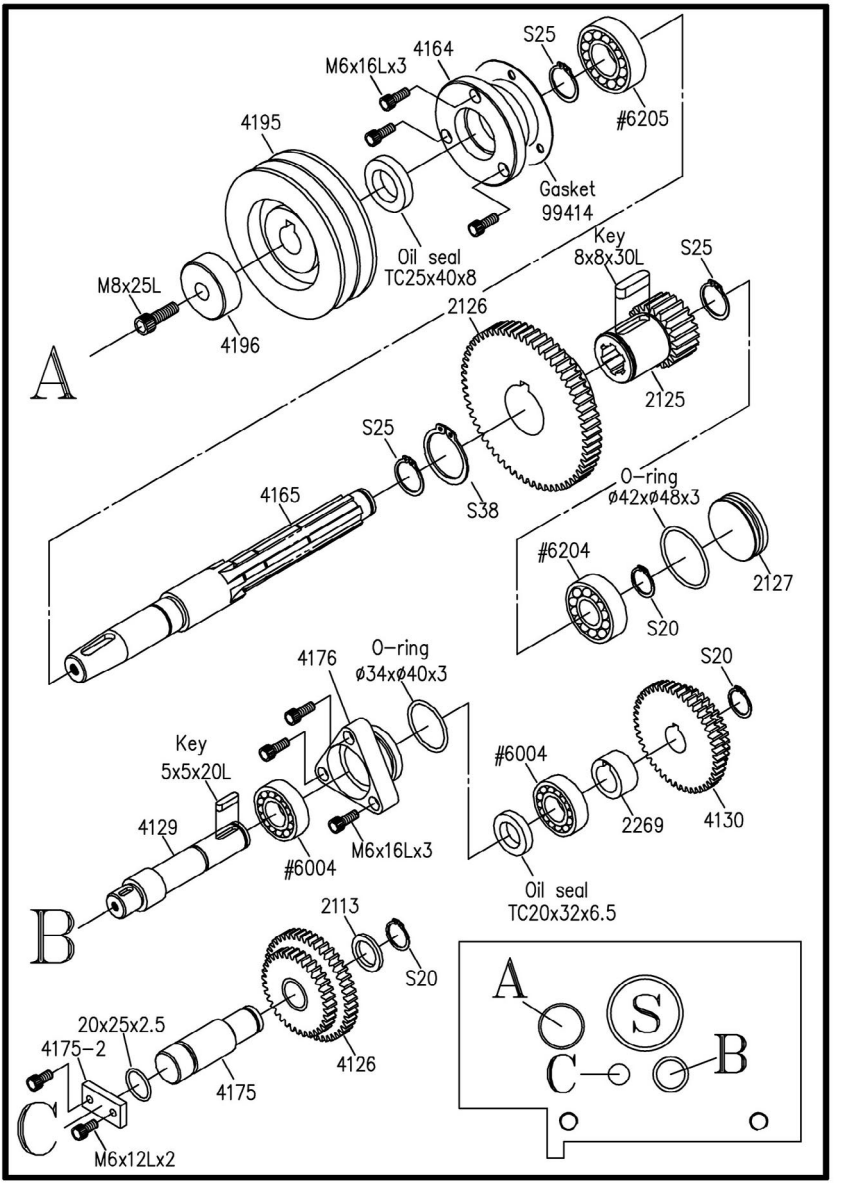
ASSEMBLY Headstock (Casting & Lever)

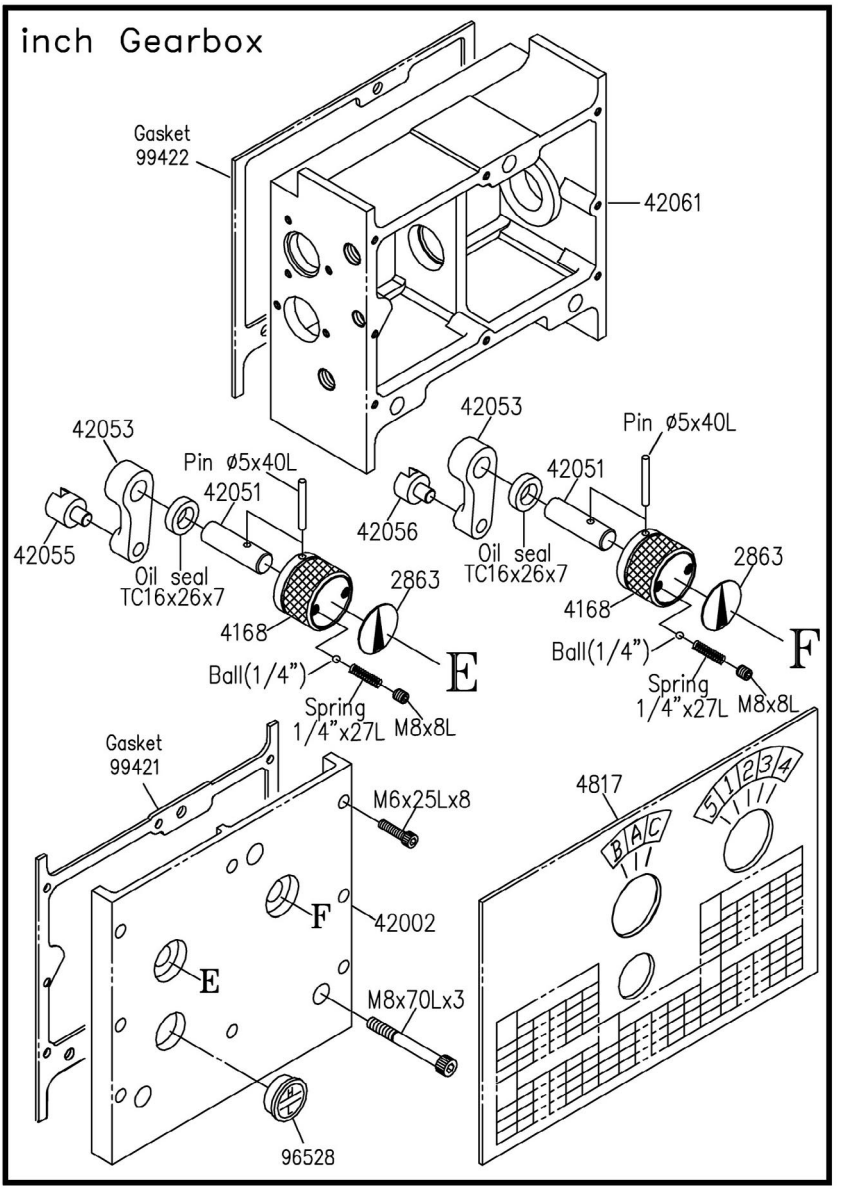


ASSEMBLY GEARBOX (Casting & Lever)

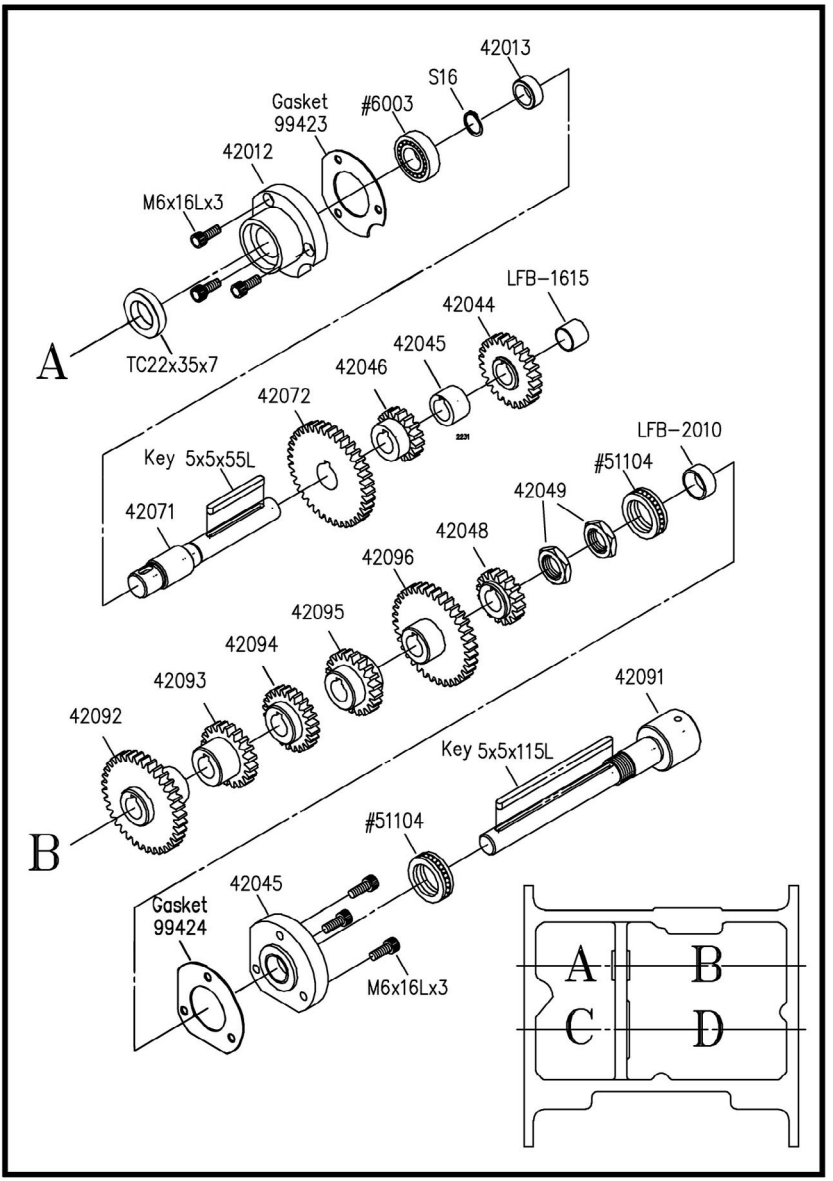


ASSEMBLY GEARBOX (Casting & Lever)

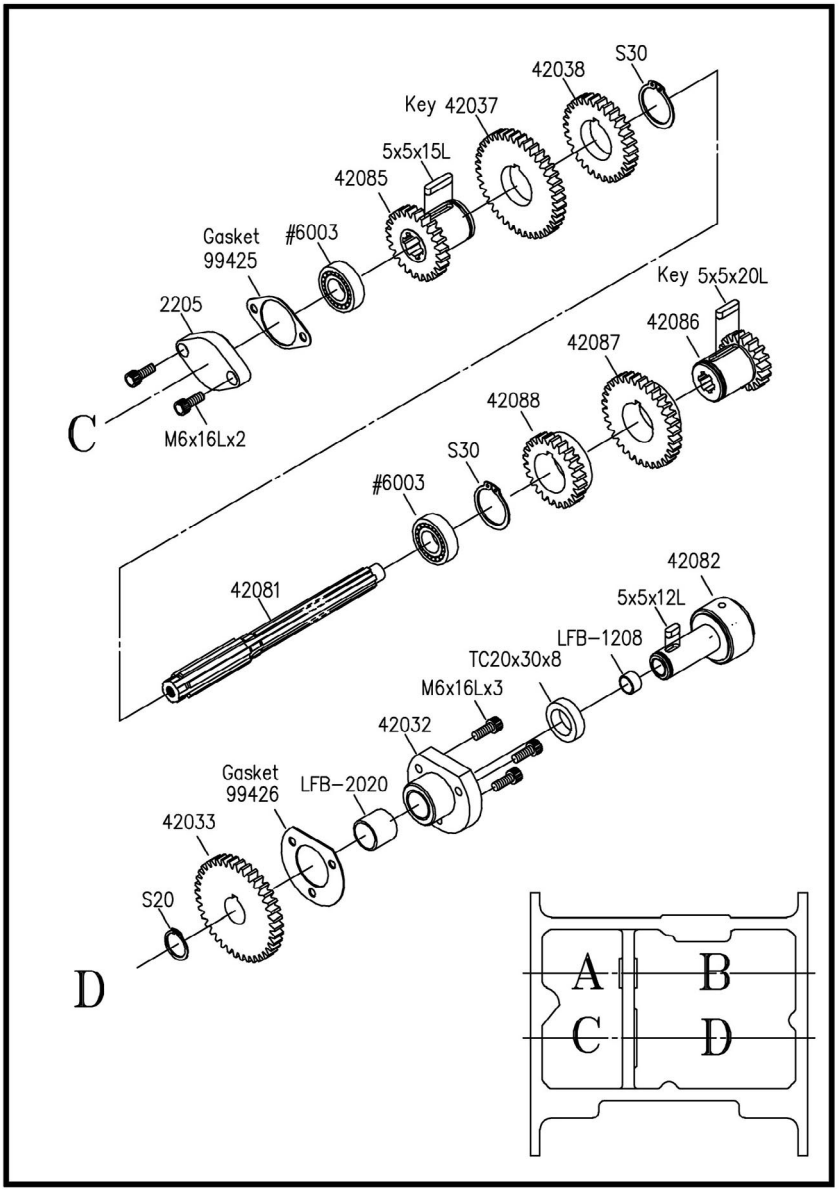



inch Gearbox
Gasket
99422
42061
42053
Pin ø5x40L
42051
42055
Oil seal
TC16x26x7
2863
4168
E
Ball(1/4")
Spring
1/4"x27L
M8x8L
42053
Pin ø5x40L
42051
42056
Oil seal
TC16x26x7
2863
4168
F
Ball(1/4")
Spring
1/4"x27L
M8x8L
Gasket
99421
M6x25Lx8
F
42002
E
M8x70Lx3
96528
4817
B
A
C
5
1
2
3
4

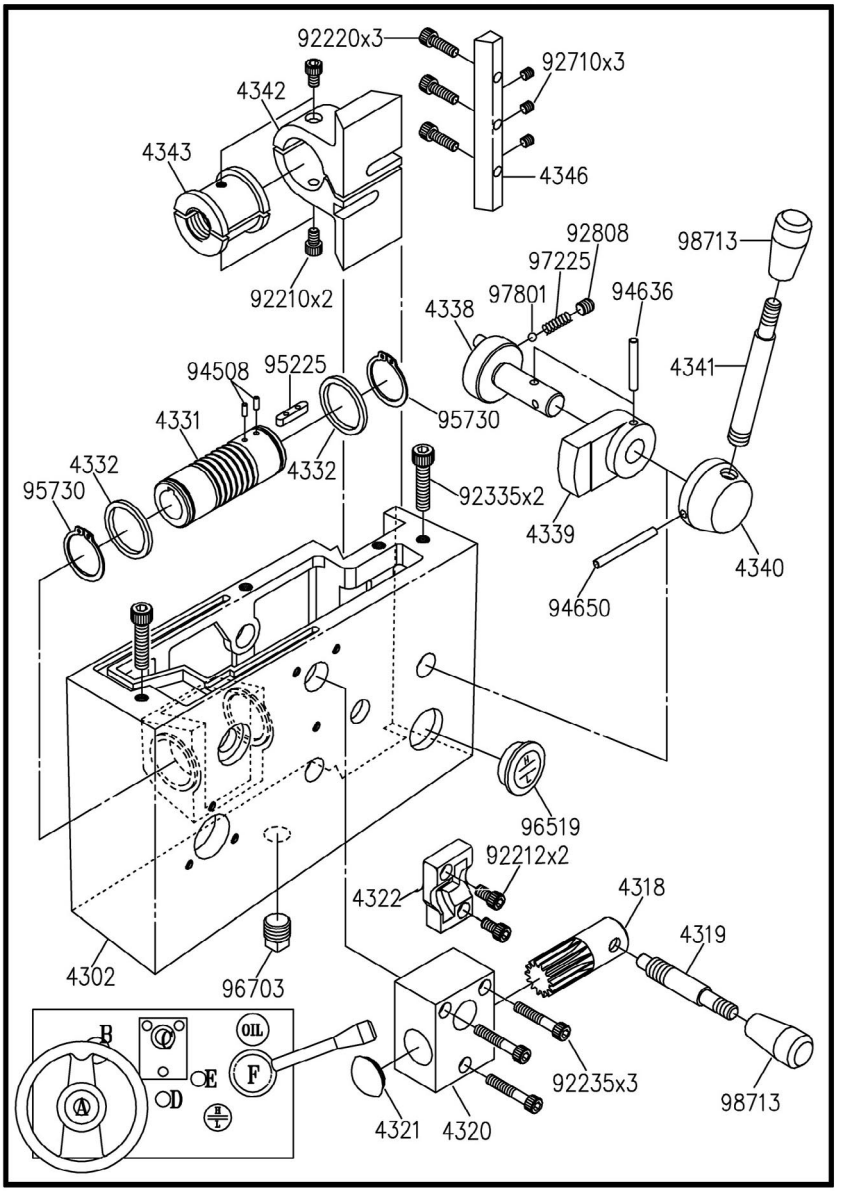
GEARBOX Inch Gearbox



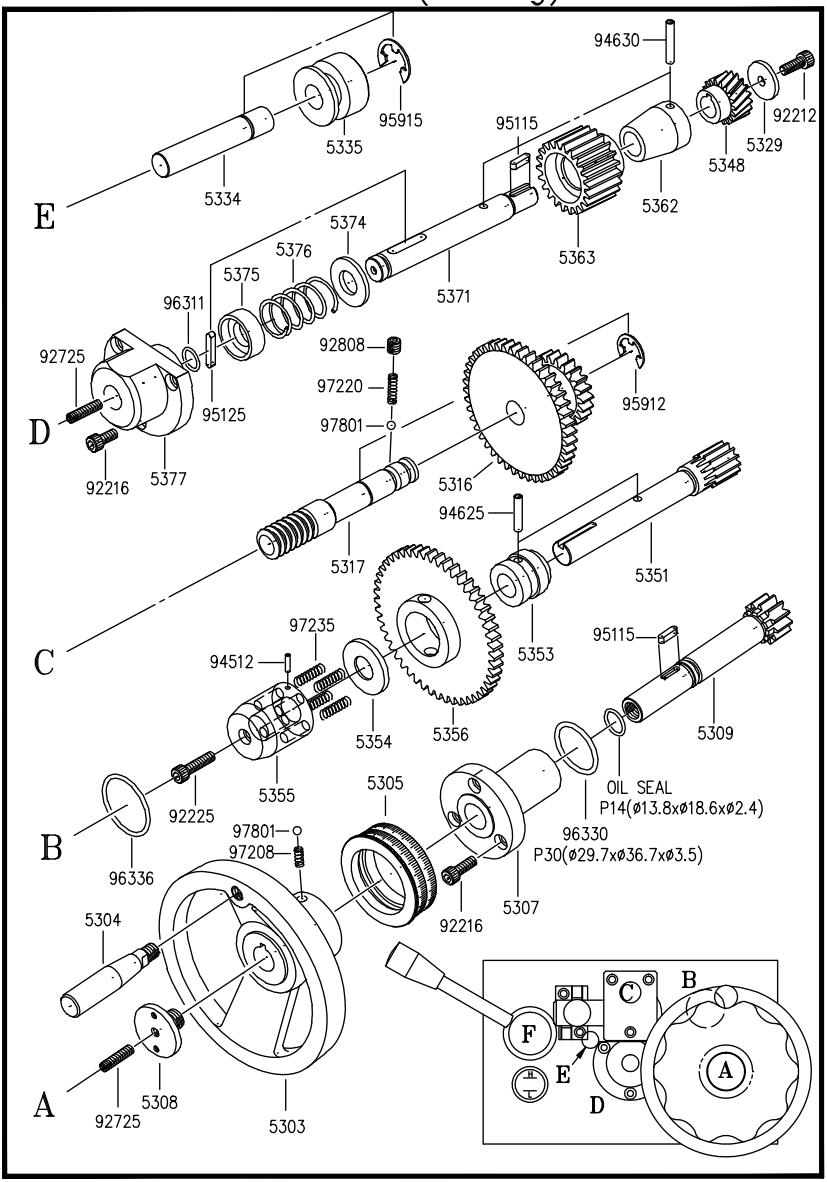
GEARBOX Inch Gearbox



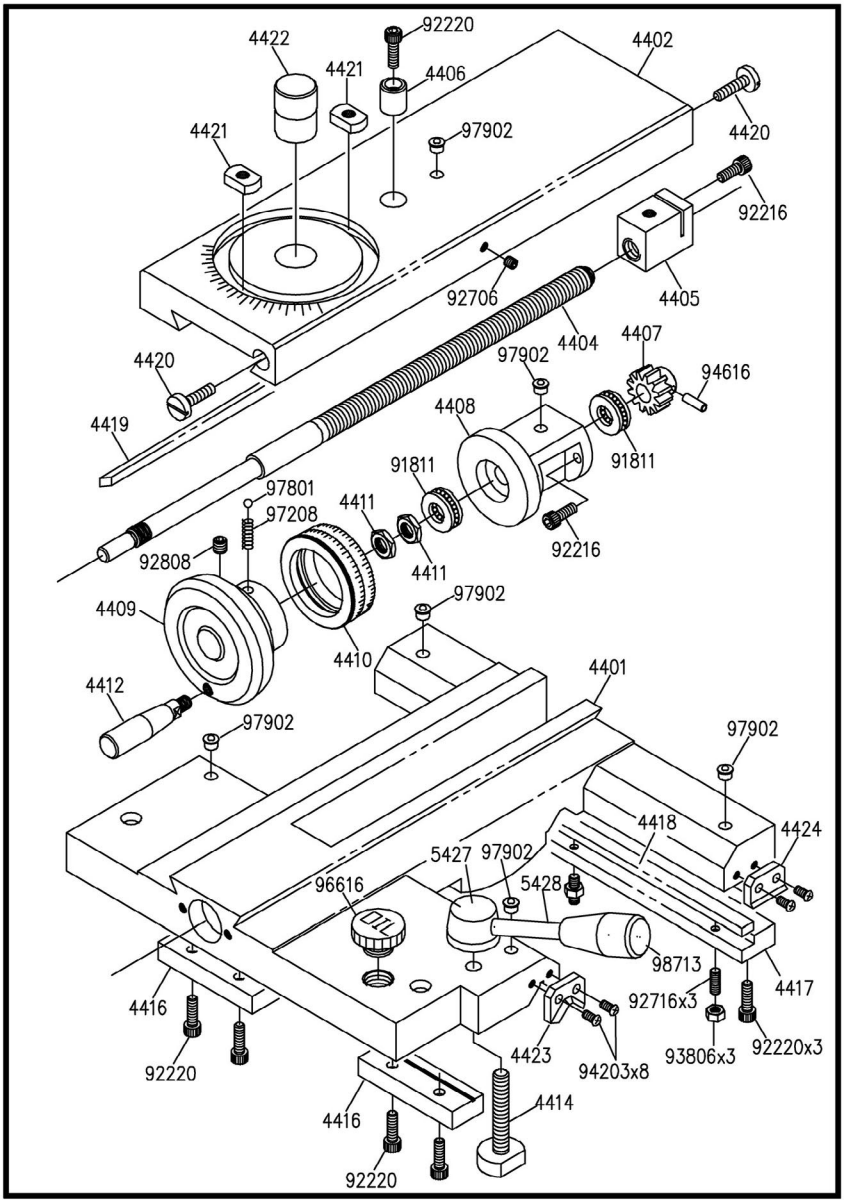
ASSEMBLY APRON (Casting)



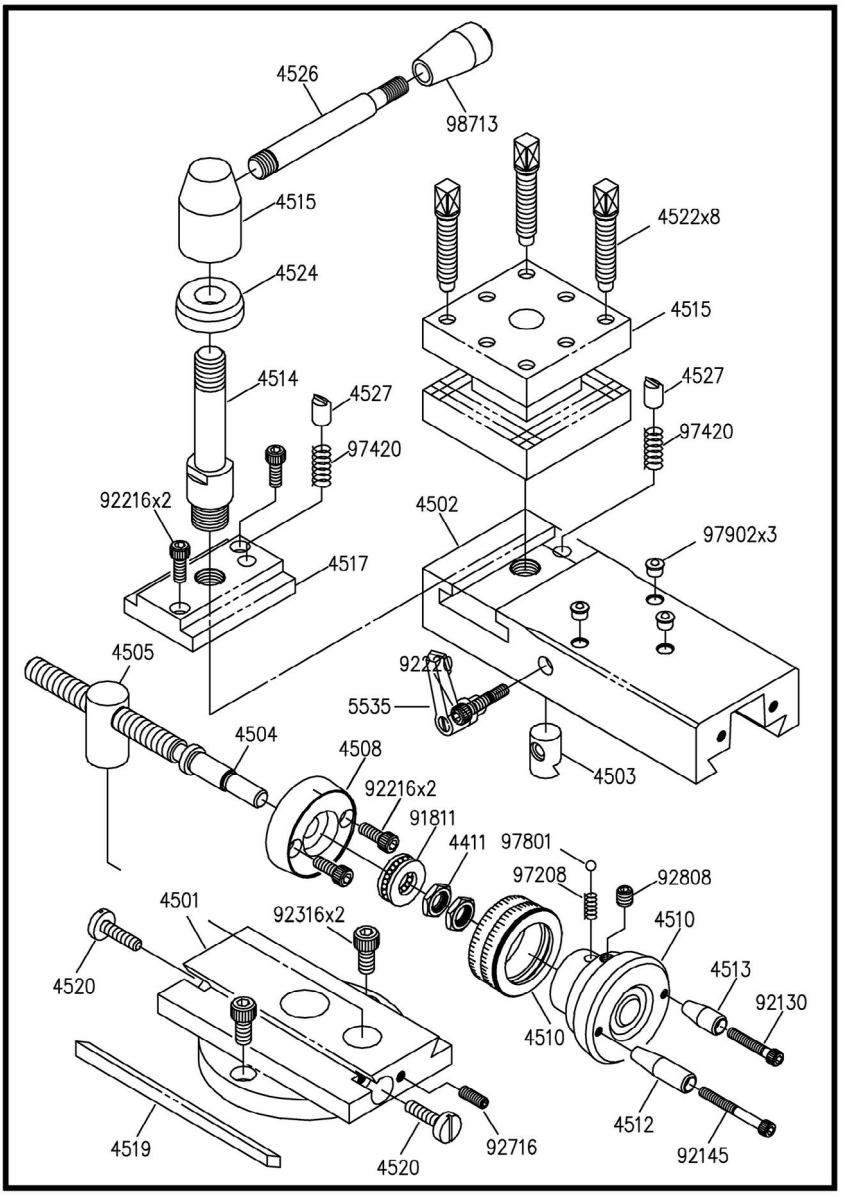
ASSEMBLY APRON (Casting)



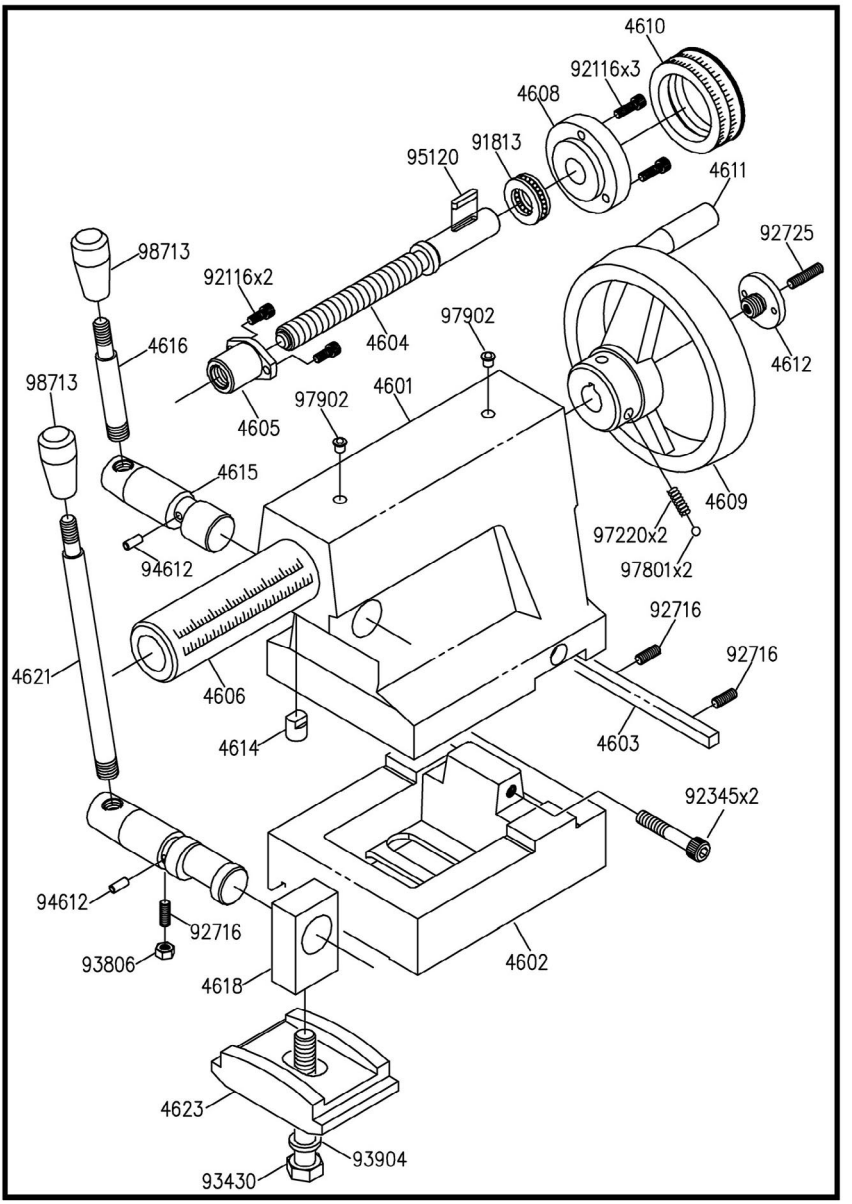
ASSEMBLY SADDLE, CROSS-SLIDE

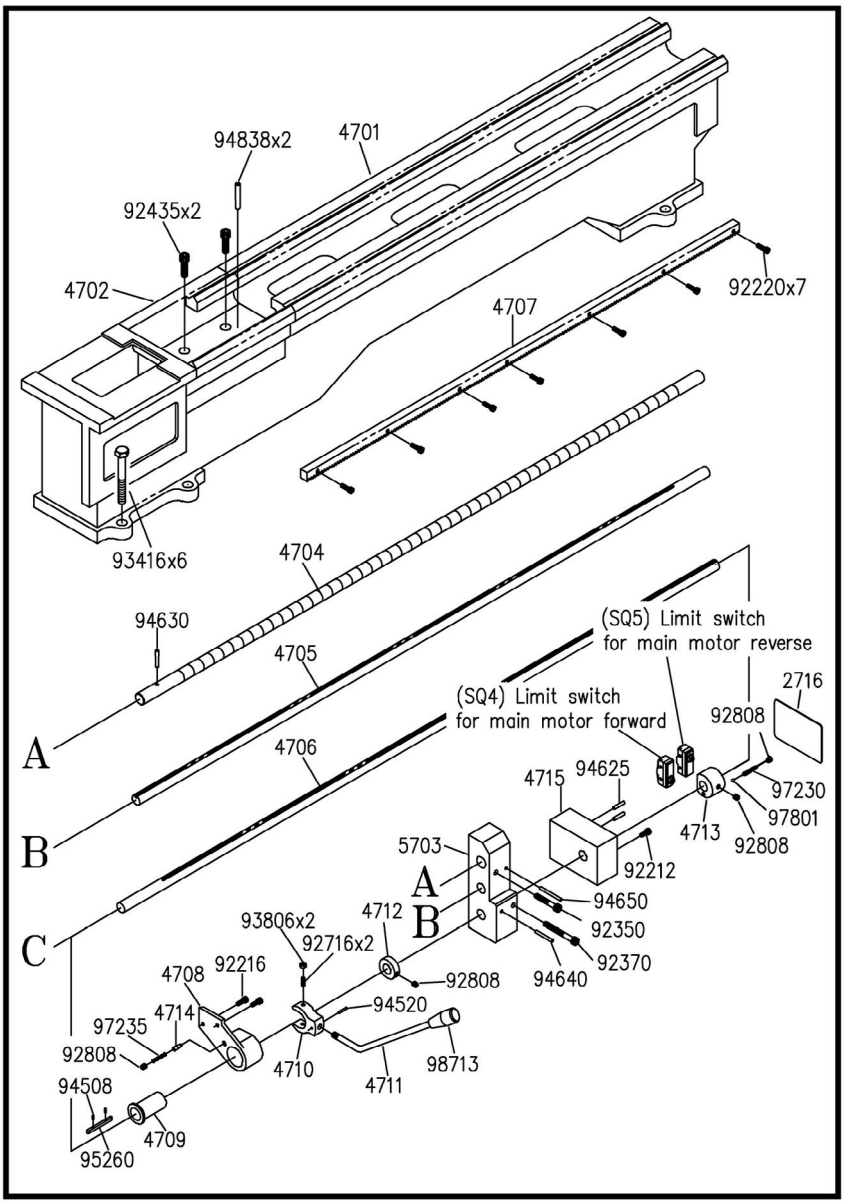


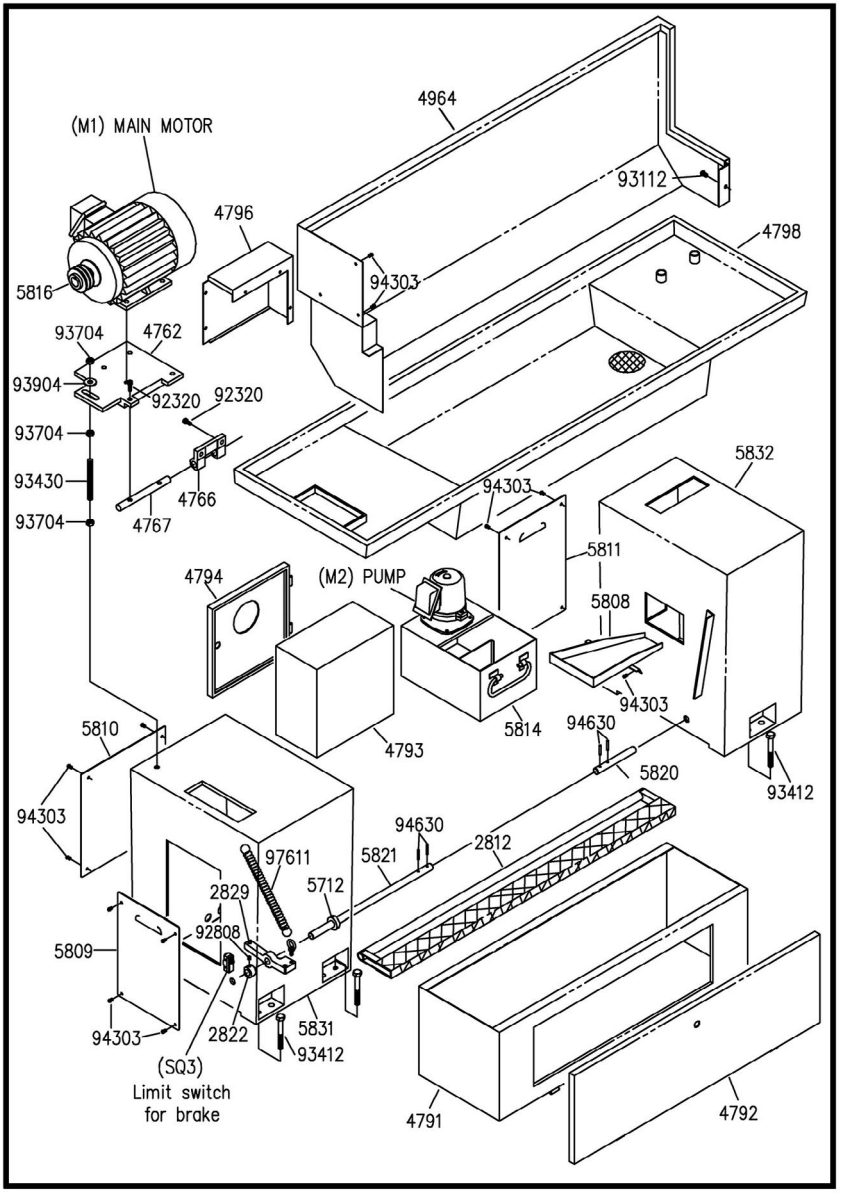
ASSEMBLY TOP-SLIDE



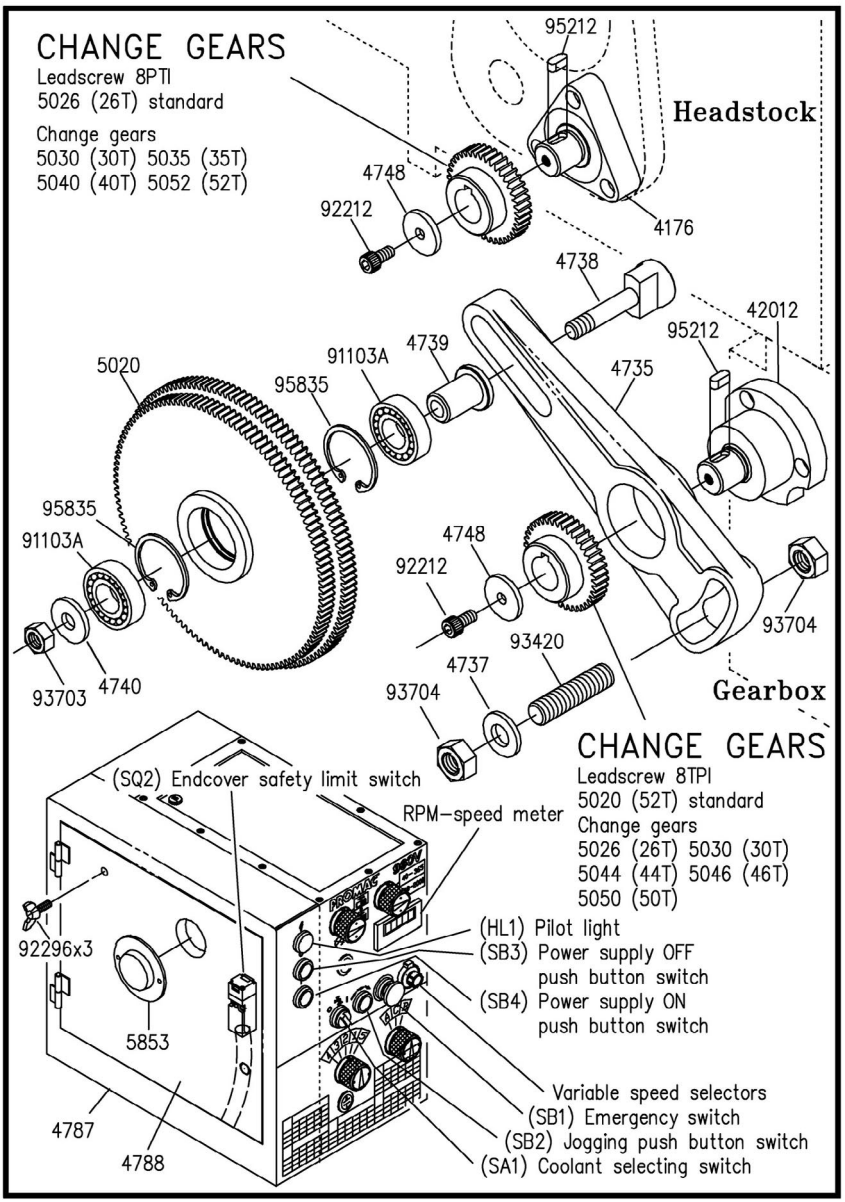
ASSEMBLY TAILSTOCK




94838x2
4701
92435x2
4702
4707
92220x7
93416x6
4704
94630
4705
A
B
C
4706
(SQ5) Limit switch
for main motor reverse
(SQ4) Limit switch
for main motor forward
2716
92808
4715
94625
97230
97801
4713
92808
5703
A
B
92212
94650
92350
92370
94640
4712
93806x2
92716x2
92808
4708
92216
94520
4714
97235
92808
4710
4711
98713
94508
4709
95260

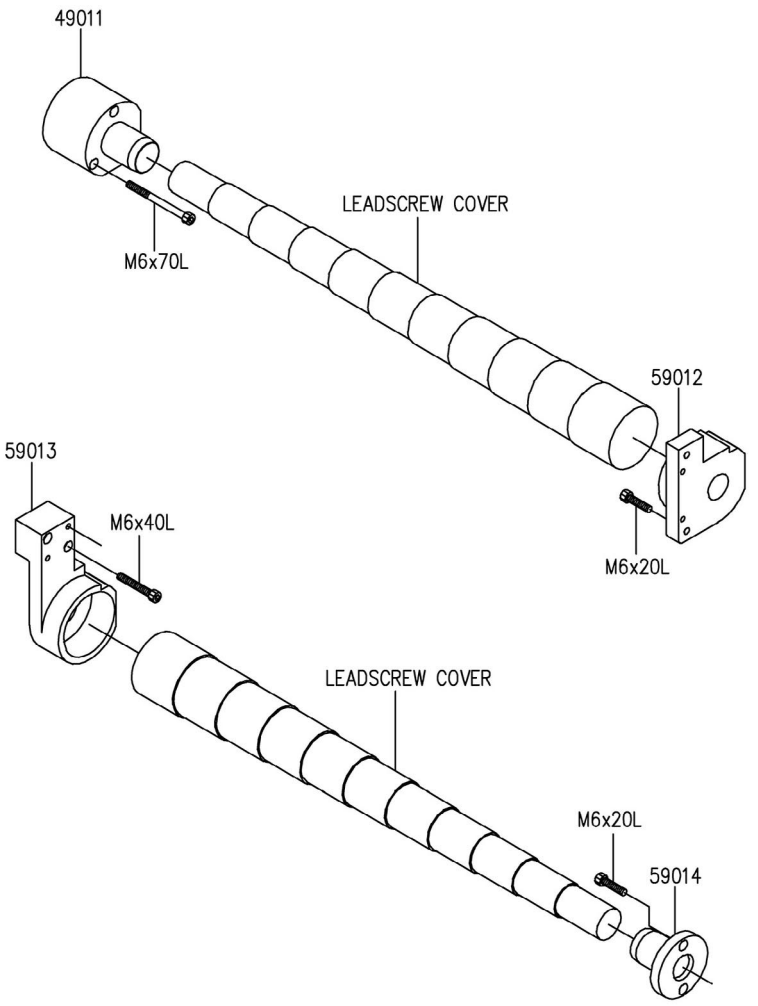

(M1) MAIN MOTOR
4964
93112
4796
4798
5816
94303
93704
4762
93904
92320
92320
93704
93430
4766
93704
4767
5832
94303
5811
4794
(M2) PUMP
5808
94303
5810
4793
5814
94630
5820
93412
94303
94630
97611
5821
2812
5712
2829
92808
5809
94303
2822
5831
93412
(SQ3)
Limit switch
for brake
4791
4792

ASSEMBLY SWING FRAME,END GEARS & COVER

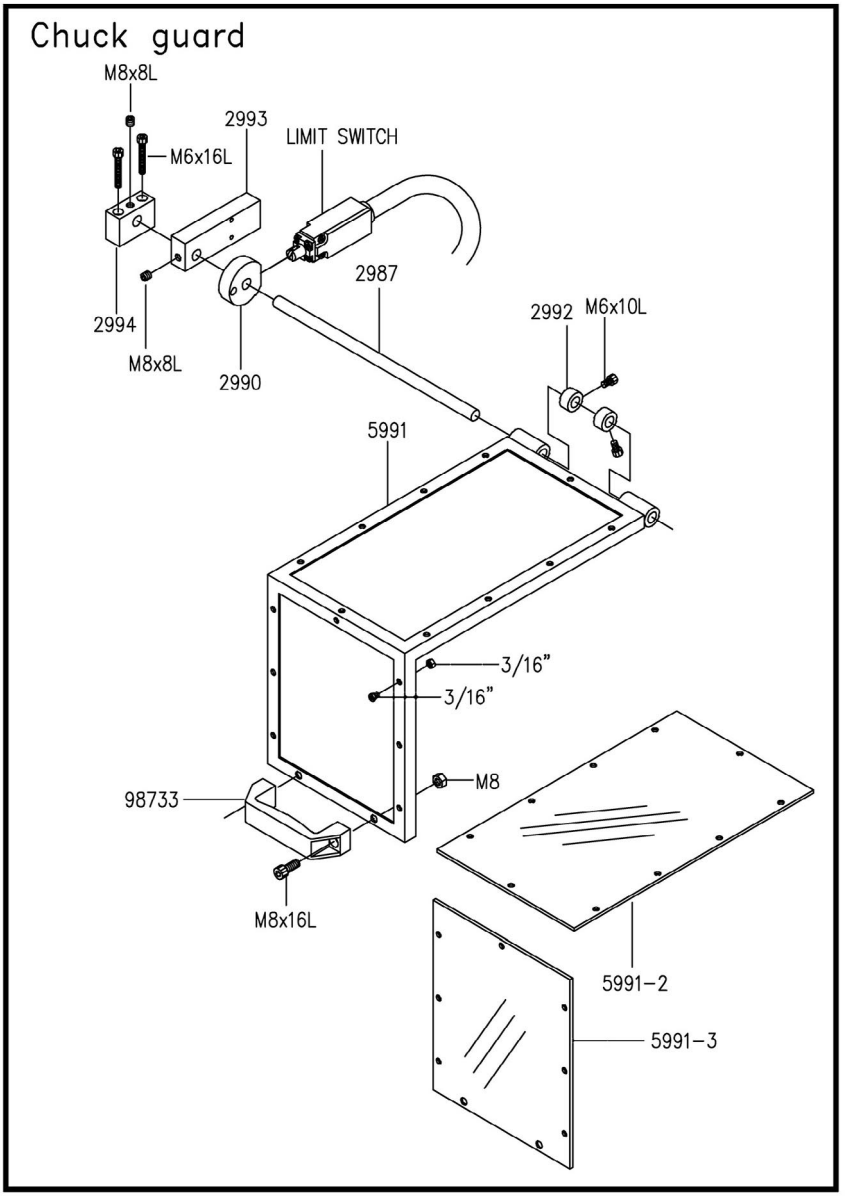


GUARD

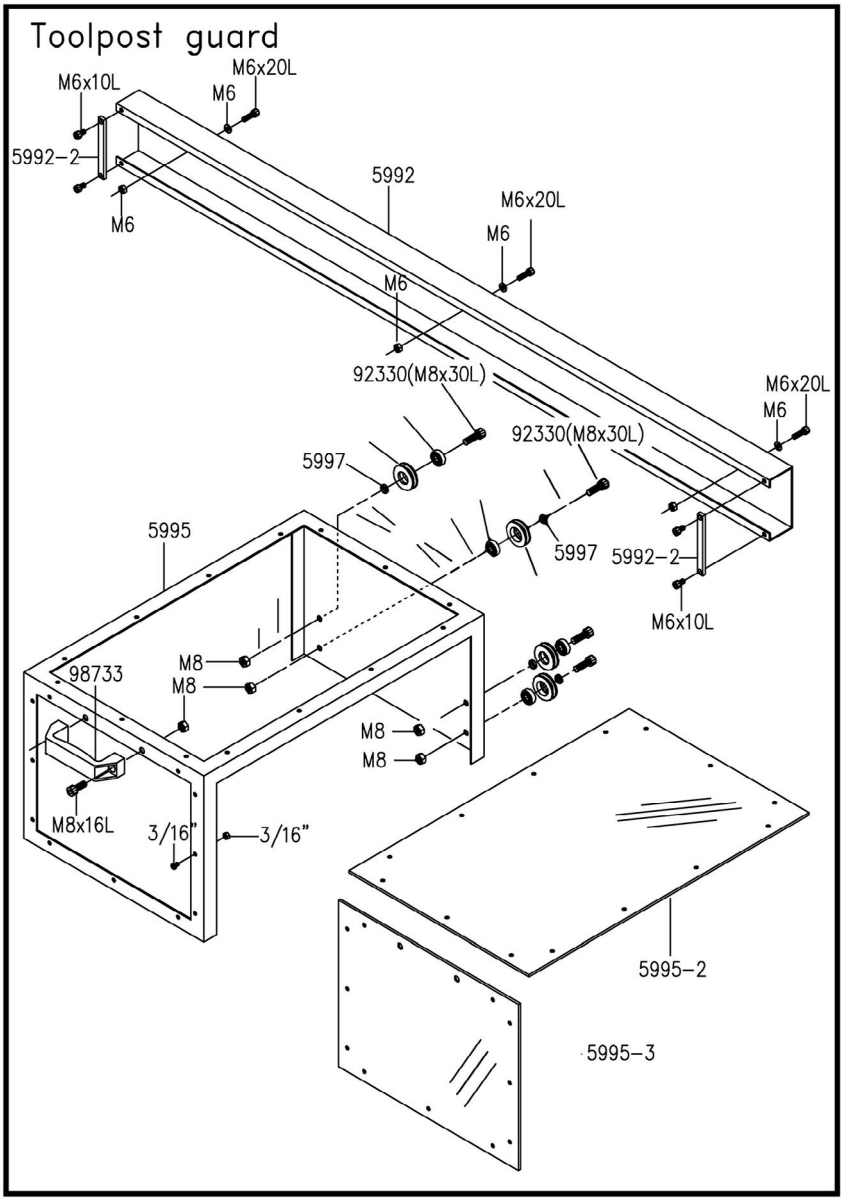
Leadscrew cover



GUARD


Chuck guard
M8x8L
2993
LIMIT SWITCH
M6x16L
2987
2994
M8x8L
2990
2992
M6x10L
5991
3/16"
3/16"
M8
98733
M8x16L
5991-2
5991-3

GUARD


Toolpost guard
M6x10L
M6x20L
M6
5992-2
5992
M6x20L
M6
M6
92330(M8x30L)
M6x20L
M6
92330(M8x30L)
5997
5995
5997
5992-2
M6x10L
M8
98733
M8
M8
M8
M8x16L
3/16"
3/16"
5995-2
5995-3

PARTS LIST FOR HEADSTOCK GEARBOX

Ref. No.	Description	Part Number	Qty.
ASM1	Gearbox Assembly	9646959.01	
4110	Cover	See gearbox ASM1	1
4117	Collar	See gearbox ASM1	1
4118	Gear 1.75M, 451	See gearbox ASM1	1
4119	Collar	See gearbox ASM1	1
4124	Collar	See gearbox ASM1	1
4126	Gear 1.75M, 35/451	See gearbox ASM1	1
4129	Shaft	See gearbox ASM1	1
4130	Gear 1.75M, 35/451	See gearbox ASM1	1
4131	Collar	See gearbox ASM1	1
4134	Lever	See gearbox ASM1	1
4135	Shift fork	See gearbox ASM1	1
2125	Gear 2M, 21T	See gearbox ASM1	1
2126	Gear 2M, 601	See gearbox ASM1	1
2127	Plug	See gearbox ASM1	1
2132	Nut	See gearbox ASM1	1
2136	Gear 2M, 821	See gearbox ASM1	1
2137	Gear 2M,431	See gearbox ASM1	1
2172	Shift fork	See gearbox ASM1	2
5886	Index ring	See gearbox ASM1	1
641732	Collar	See gearbox ASM1	1
4160	Headstock casting	See gearbox ASM1	1
4162	Cover	See gearbox ASM1	1
4163	Cover	See gearbox ASM1	1
4164	Cover	See gearbox ASM1	1
4165	Shaft	See gearbox ASM1	1
4166	Shaft	See gearbox ASM1	1
4167	Shaft	See gearbox ASM1	1
4173	Main Spindle	9646960.01	1
4175	Shaft	9646961.01	1
4176	Cover	9646962.01	1
4177	Shift fork	9646963.01	1
4192	Collar	9646964.01	1
4196	Washer	9646965.01	1
4197	Pulley	9646966.01	1
4198	Pulley	9646967.01	1
42087	Gear 2.75M	9646968.01	1
42088	Gear 2M, 251	9646969.01	1
42091	Shaft	9646970.01	1
42092	Gear 2M, 301	9646971.01	1
42093	Gear 2.75M, 201	9646972.01	1
42094	Gear 2.75M, 181	9646973.01	1
42095	Gear 2.75M, 161	9646974.01	1
42096	Gear 2.25M, 281	9646975.01	1

∆ Not shown. N/A Not available as repair part. * Standard hardware item, available locally.

PARTS LIST FOR HEADSTOCK GEARBOX (CONT.INUED)

Ref. No.	Description	Part Number	Qty.
42012	Cover	9646976.01	1
42013	Collar	9646977.01	1
42022	Cover	9646978.01	1
42032	Cover	9646979.01	1
42033	Gear 2M, 381	9646980.01	1
42037	Gear 2M, 401	9646981.01	1
42038	Gear 2M, 301	9646982.01	1
42042	Cover	9646983.01	1
42044	Gear 2M 241	9646984.01	1
42045	Collar (2231)	9646985.01	1
42046	Gear 2M 161	9646986.01	1
42048	Gear 2M 161	9646987.01	1
42049	Nut	9646988.01	2
42051	Lever	9646989.01	2
42052	Handle	9646990.01	2
42053	Shift lever	9646991.01	2
42055	Shift fork	9646992.01	1
42065	Shift fork	9646993.01	1
42071	Shaft	9646994.01	1
42072	Gear 2M 321	9646995.01	1
42081	Shaft	9646996.01	1
42082	Shaft	9646997.01	1
42085	Gear 2M 201	9646998.01	1
4173	Main Spindle	9646999.01	1
4175	Shaft	9647000.01	1
4176	Cover	9647001.01	1
4177	Shift fork	9647002.01	1
4192	Collar	9647003.01	1
4195	Pulley	9647004.01	1
42093	Gear 2.75M, 201	9647005.01	1
4196	Washer	9647006.01	1
4197	Pulley	9647007.01	1
4198	Pulley	9647008.01	1

∆ Not shown. N/A Not available as repair part. * Standard hardware item, available locally.

PARTS LIST FOR LEADSCREW COVER

Ref. No.	Description	Part Number	Qty.
49011	Support	9647009.01	
59012	Bracket	9647010.01	
59013	Bracket	9647011.01	
59014	Support	9647012.01	
92220	Socket Head Cap Screw M6x20	*	
92240	Socket Head Cap Screw M6x40	*	
92270	Socket Head Cap Screw M6x70	*	

PARTS LIST FOR CHUCK GUARD

Ref. No.	Description	Part Number	Qty.
2987	Support Rod	9647013.01	
2992	Collar	9647014.01	
2993	Bracket	9647015.01	
2994	Support	9647016.01	
5991	Chuck Guard	9647017.01	
5991-2	Chuck Guard Shield	9647018.01	
5991-3	Chuck Guard Shield	9647019.01	
92210	Socket Head Cap Screw M6x10	*	
92316	Socket Head Cap Screw M6x16	*	
92808	Set Screw M8x8	*	
93700	Nut 3/16"	*	
93808	Nut M8	*	
94203	Screw 3/16"x3/8	*	
98751	Handle	9647020.01	

Δ Not shown. N/A Not available as repair part. * Standard hardware item, available locally.

PARTS LIST FOR TOOLPOST GUARD

Ref. No.	Description	Part Number	Qty.
5992	Guide Rod Guide	9647021.01	
5992-2	Plate Toolpost	9647022.01	
5995	Guard Toolpost	9647023.01	
5995-2	Guard Toolpost	9647024.01	
5995-3	Guard Roller	9647025.01	
5988	Collar	9647026.01	
5997	Bearing 608	9647027.01	
91112	Socket Head Cap Screw M6x10	*	
92210	Socket Head Cap Screw M6x20	*	
92220	Socket Head Cap Screw M8x16	*	
92316	Socket Head Cap Screw M8x25	*	
92325	Nut 3/16"	*	
93700	Nut 3/16"	*	
93806	Nut MG	*	
93808	Nut MB	*	
94203	Screw 3/16"x3/8	*	
98751	Handle	9647029.01	

Δ Not shown. N/A Not available as repair part. * Standard hardware item, available locally.

PARTS LIST FOR MISCELLANEOUS & HARDWARE

Ref. No.	Description	Part Number	Qty.
99411	Gasket for Headstock Cover4163	9647030.01	
99412	Gasket for 4162	9647031.01	
99413	Gasket for 4110	9647032.01	
99414	Gasket for 4164	9647033.01	
99421	Gasket for Gearbox Cover 42002	9647034.01	
99422	Gasket for Gearbox 42001	9647035.01	
99424	Gasket for 42045	9647036.01	
99425	Gasket for 2205	9647037.01	
99426	Gasket for 42032	9647038.01	
99471	Gasket for 4715	9647039.01	
91011	Bearing 608	*	
91121	Bearing 6003	*	
91122	Bearing 60032	*	
91123	Bearing 6004	*	
91125	Bearing 6005	*	
91131	Bearing 6202	*	
91133	Bearing 6204	*	
91135	Bearing 6205	*	
91532	Bearing 30210	*	
91544	Bearing 32212	*	
91812	Thrust Bearing 51101	*	
91813	Thrust Bearing 51102	*	
91814	Thrust Bearing 51103	*	
91815	Thrust Bearing 51104	*	
91816	Thrust Bearing 51105	*	
91823	Thrust Bearing 51202	*	
91824	Thrust Bearing 51203	*	
91841	Thrust Bearing 2901	*	
91842	Thrust Bearing 2902	*	
91843	Thrust Bearing 2903	*	
91844	Thrust Bearing 2904	*	
92116	Socket Head Cap Screw M5x16	*	
92130	Socket Head Cap Screw M5x30	*	
92145	Socket Head Cap Screw M5x45	*	
92210	Socket Head Cap Screw M6x10	*	
92212	Socket Head Cap Screw M6x12	*	
92216	Socket Head Cap Screw M6x16	*	
92220	Socket Head Cap Screw M6x20	*	
92225	Socket Head Cap Screw M6x25	*	
92230	Socket Head Cap Screw M6x30	*	
92235	Socket Head Cap Screw M6x35	*	
92240	Socket Head Cap Screw M6x40	*	
92245	Socket Head Cap Screw M6x45	*	
92250	Socket Head Cap Screw M6x50	*	

Δ Not shown. N/A Not available as repair part. * Standard hardware item, available locally.

PARTS LIST FOR MISCELLANEOUS & HARDWARE (CONTINUED)

Ref. No.	Description	Part Number	Qty.
92255	Socket Head Cap Screw M6x55	*	
92296	Butterfly Screw M6x16	*	
92312	Socket Head Cap Screw M8x12	*	
92316	Socket Head Cap Screw M8x16	*	
92320	Socket Head Cap Screw M8x20	*	
92325	Socket Head Cap Screw M8x25	*	
92330	Socket Head Cap Screw M8x30	*	
92335	Socket Head Cap Screw M8x35	*	
92340	Socket Head Cap Screw M8x40	*	
92345	Socket Head Cap Screw M8x45	*	
92350	Socket Head Cap Screw M8x50	*	
92370	Socket Head Cap Screw M8x70	*	
92425	Socket Head Cap Screw M10x25	*	
92430	Socket Head Cap Screw M10x30	*	
92435	Socket Head Cap Screw M10x30	*	
92440	Socket Head Cap Screw M10x40	*	
92445	Socket Head Cap Screw M10x45	*	
92525	Socket Head Cap Screw M12x25	*	
92535	Socket Head Cap Screw M12x35	*	
92540	Socket Head Cap Screw M12x40	*	
92706	Set Screw M6x6	*	
92708	Set Screw M6x8	*	
92710	Set Screw M6x10	*	
92712	Set Screw M6x12	*	
92716	Set Screw M6x16	*	
92720	Set Screw M6x20	*	
92725	Set Screw M6x25	*	
92808	Set Screw M8x8	*	
92814	Set Screw M8x14	*	
92012	Set Screw M12x12	*	
93112	Cap Screw 1/4x1-1/4"	*	
93114	Cap Screw 3/8x1-1/2"	*	
93320	Cap Screw 3/8x2"	*	
93324	Cap Screw 3/8x2-1/2"	*	
93330	Cap Screw 3/8x3"	*	
93406	Cap Screw 1/2x3/4"	*	
93412	Cap Screw 1/2x1-1/4"	*	
93414	Cap Screw 1/2x1-1/2"	*	
93416	Cap Screw 1/2x1-3/4"	*	
93420	Cap Screw 1/2x2"	*	
93424	Cap Screw 1/2x1-1/2"	*	
93430	Cap Screw 1/2x3"	*	
93700	Nut 3/16"	*	
93701	Nut 1/4"	*	

Δ Not shown. N/A Not available as repair part. * Standard hardware item, available locally.

PARTS LIST FOR MISCELLANEOUS & HARDWARE (CONTINUED)

Ref. No.	Description	Part Number	Qty.
93703	Nut 3/8"	*	
93704	Nut 1/2"	*	
93806	Nut M6	*	
93808	Nut M8	*	
93903	Washer 3/8"	*	
93904	Washer 1/2"	*	
93906	Washer 3/4"	*	
93912	Washer M6	*	
93942	Lock Washer M6	*	
93913	Washer M8	*	
93943	Lock Washer M8	*	
94102	Screw 1/8x1/4"	*	
94103	Screw 1/8x3/8"	*	
94202	Screw 3/16x1/4"	*	
94203	Screw 3/16x3/4"	*	
94303	Screw 1/4x3/8"	*	
94308	Screw 5/32x3/16"	*	
94403	Nail M2	*	
94409	Screw 1/4x1mm	*	
94508	Pin M3x8	*	
94512	Pin M3x12	*	
94520	Pin M3x20	*	
94524	Pin M3x24	*	
94612	Pin M5x12	*	
94616	Pin M5x12	*	
94625	Pin M5x12	*	
94630	Pin M5x12	*	
94634	Pin M5x12	*	
94635	Pin M5x12	*	
94636	Pin M5x12	*	
94640	Pin M5x12	*	
94645	Pin M5x12	*	
94650	Pin M5x12	*	
94660	Pin M5x12	*	
94830	Taper Pin M4x30	*	
94838	Taper Pin M4x38	*	
95110	Key M4x10	*	
95115	Key M4x15	*	
95120	Key M4x20	*	
95140	Key M4x40	*	
95210	Key M5x10	*	
95212	Key M5x12	*	
95215	Key M5x15	*	
95220	Key M5x20	*	

Δ Not shown. N/A Not available as repair part. * Standard hardware item, available locally.

PARTS LIST FOR MISCELLANEOUS & HARDWARE (CONTINUED)

Ref. No.	Description	Part Number	Qty.
95225	Key M5x25	*	
95230	Key M5x30	*	
95235	Key M5x35	*	
95240	Key M5x40	*	
95244	Key M5x44	*	
95245	Key M5x45	*	
95250	Key M5x50	*	
95260	Key M5x60	*	
95270	Key M5x70	*	
95310	Key M6x10	*	
95315	Key M6x15	*	
95325	Key M6x25	*	
95375	Key M6x75	*	
95390	Key M6x90	*	
95420	Key M7x20	*	
95440	Key M7x40	*	
95450	Key M7x50	*	
95460	Key M7x60	*	
95520	Key M8x20	*	
95530	Key M8x30	*	
95540	Key M8x40	*	
95550	Key M8x50	*	
95560	Key M8x60	*	
95570	Key M8x70	*	
95712	Circlip S-12mm	*	
95715	Circlip S-15mm	*	
95716	Circlip S-16mm	*	
95718	Circlip S-18mm	*	
95720	Circlip S-20mm	*	
95725	Circlip S-25mm	*	
95730	Circlip S-30mm	*	
95738	Circlip S-38mm	*	
95740	Circlip S-40mm	*	
95750	Circlip S-50mm	*	
95755	Circlip S-55mm	*	
95835	Circlip R-35mm	*	
95847	Circlip R-47mm	*	
95906	Circlip E-6mm	*	
95912	Circlip E-12mm	*	
95915	Circlip E-15mm	*	
95919	Circlip E-19mm	*	
96103	Oil Seal TC 25x45x11mm	*	
96104	Oil Seal TC 25x40x8mm	*	
96308	O-Ring 8x12x12mm	*	

Δ Not shown. N/A Not available as repair part. * Standard hardware item, available locally.

PARTS LIST FOR MISCELLANEOUS & HARDWARE (CONTINUED)

Ref. No.	Description	Part Number	Qty.
96309	O-Ring 8.8x12.6x1.9mm	*	
96311	O-Ring 11x16x2.5mm	*	
96314	O-Ring 14x19x2.5mm	*	
96316	O-Ring 15.8x20.6x2.4mm	*	
96320	O-Ring 20x25x2.5mm	*	
96324	O-Ring 24x30x3.0mm	*	
96325	O-Ring 25x31x3.0mm	*	
96334	O-Ring 34x40x3.0mm	*	
96338	O-Ring 38x45x3.5mm	*	
96343	O-Ring 43x51x4.0mm	*	
96344	O-Ring 44x50x3.0mm	*	
96358	O-Ring 58x64x3.0mm	*	
96519	Oil Sight 3/4"	9647040.01	
96528	Oil Sight 1-1/8"	9647041.01	
96603	Plug 3/8" GP	9647042.01	
96616	Plug 3/4" (PVC)	9647043.01	
96703	Plug 3/8" GP	9647044.01	
96704	Plug 1/2" GP	9647045.01	
96803	Elbow 3/8" GP	9647046.01	
97115	Spring 3/16"x15mm	9647047.01	
97208	Spring 1/4"x8mm	9647048.01	
97210	Spring 1/4"x10mm	9647049.01	
97220	Spring 1/4"x20mm	9647050.01	
97225	Spring 1/4"x25mm	9647051.01	
97230	Spring 1/4"x30mm	9647052.01	
97235	Spring 1/4"x35mm	9647053.01	
97250	Spring 1/4"x50mm	9647054.01	
97420	Spring 3/8"x20mm	9647055.01	
97430	Spring 3/8"x30mm	9647056.01	
97435	Spring 3/8"x35mm	9647057.01	
97440	Spring 3/8"x40mm	9647058.01	
97460	Spring 3/8"x60mm	9647059.01	
97611	Spring	9647060.01	
97621	Spring	9647061.01	
97801	Ball Steel 1/4" Dia	*	
97803	Ball Steel 3/8" Dia	*	
97901	Oiler 1/4"	9647062.01	
97902	Oiler 5/16"	9647063.01	
98128	V-Belt A28	9647064.01	
98713	Handle 3/8" Black	9647065.01	
98723	Handle 3/8" Red	9647066.01	
98733	Handle, Black	9647067.01	
98902	Brake Shoe Assembly	9647068.01	

Δ Not shown. N/A Not available as repair part. * Standard hardware item, available locally.

NOTES

PALMGREN WARRANTY

C.H. Hanson / Palmgren warrants their products to be free of defects in material or workmanship. This warranty does not cover defects due directly or indirectly to misuse, abuse, normal wear and tear, failure to properly maintain the product, heated, ground or otherwise altered, or used for a purpose other than that for which is was intended.

The warranty does not cover expendable and/or wear part (i.e. v-belts, screws, abrasives, jaws), damage to tools arising from alteration, abuse or use other than their intended purpose, packing and freight. The duration of this warranty is expressly limited to the terms noted below beginning from the date of delivery to the original user.

The Palmgren branded items carry the following warranties on parts:

All arbor presses, vises, clamps, positioning tables, tombstones, jack screws and vise accessories - LIFETIME.

All bench grinders, drill presses, tapping machines, band saws, lathes, milling machines, abrasive finishing machines and work stands - 3 YEARS.

The obligation of C.H. Hanson / Palmgren is limited solely to the repair or replacement, at our option, at its factory or authorized repair agent of any part that should prove inoperable. Purchaser must lubricate and maintain the product under normal operating conditions at all times. Prior to operation become familiar with product and the included materials, i.e. warnings, cautions and manuals.

Failure to follow these instructions will void the warranty.

This warranty is the purchaser's exclusive remedy against C.H. Hanson for any inoperable parts in its product. Under no circumstances is C.H. Hanson liable for any direct, indirect, incidental , special or consequential damages including loss of profits in any way elated to the use or inability to use our products. This warranty gives you specific legal rights which may vary from state to state.

PALMGREN®

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