EXTRON

PRECISION BENCH LATHE

OPERATING MANUAL
HEALTH AND SAFETY
GUIDANCE NOTES
MODEL : 18DF

VERSION : 2
DATE OF ISSUE : 7/16/1995
FILE NO. : OM-18DF1

1 OPERATING SAFETY GUIDELINES

1.1 OPERATING SAFETY PRECAUTIONS

a. THE OPERATOR MUST BE A TECHNICIAN WHO IS TRAINED IN THE OPERATION HE SHOULD HOLD THE QUALIFICATION OF CERTIFICATED LATHE OPERATOR OF A CONVENTIONAL LATHE & FAMILIAR WITH THE MANUAL.

b THE OPERATOR SHOULD WEAR SAFETY CLOTHES, SUCH AS A HELMET, SAFETY GLASSES WORKING CLOTHES, SAFETY SHOES ..... ETC, WHICH MUST CONFORM WITH LOCAL INDUSTRIAL SAFETY REGULATIONS.

c. KEEP THE MACHINE AND WORK AREA NEAT, CLEAN AND TIDY.

d. KEEP ALL GUARDS AND COVER PLATES IN PLACE AND ALL MACHINE CABINET DOORS CLOSED.

e. NEVER LAY ANYTHING ON THE WORKING SURFACES OF THE MACHINE, WHERE IT MAY FOUL ROTATING OR MOVING PARTS.

f. DO NOT TOUCH OR REACH OVER MOVING OR ROTATING MACHINE PARTS.

g. ENSURE YOU KNOW HOW TO STOP THE MACHINE BEFORE STARTING IT.

h. DO NOT OPERATE THE MACHINE IN EXCESS OF ITS RATED CAPACITY.

i. DO NOT WEAR RINGS, WATCHES, TIES OR LOOSE SLEEVED CLOTHING.

j. STOP THE MACHINE IMMEDIATELY IF ANYTHING UNEXPECTED HAPPENS.

k. DO NOT INTERCHANGE CHUCKS OR OTHER SPINDLE MOUNTING ITEMS WITHOUT CHECKING FOR CORRECT LOCKING AND MAXIMUM SPEED RATING.

l. CHECK THE LOAD CAPACITY OF REVOLVING CENRES FOR THE CURRENT APPLICATION.

m. ISOLATE THE MACHINE WHEN LEAVING IT UNATTENDED.

n. THE USE OF FLUID CAUSING POISONING OR CORROSION WHILE CUTTINGS PROHIBITED.

o. DO NOT CUTTING MAGNESIUM METAL OR HIGH MAGNESIUM ALLOYS OR ANY OTHER MATERIAL WHICH MAY GENERATE FLAMMABLE HAZARDS.

1.2 OPERATING POTENTIAL HAZARDS

SAFE OPERATION OF LATHE CHUCKS

WHERE DETAILS OF OPERATING SPEEDS AND OF MAXIMUM RECOMMENDED OPERATING SPEEDS ARE SUPPLIED THESE ARE INTENDED ONLY AS A GUIDE. SUCH DETAILS MUST BE REGARDED AS FOR GENERAL GUIDANCE ONLY.

DO NOT USE DAMAGED CHUCKS.

THE GRIPPING POWER REQUIRED FOR ANY GIVEN APPLICATION IS NOT KNOW IN ADVANCE SO THAT CARE WHEN SELECTING AN APPROPRIATE CHUCK..

THE ACTUAL GRIPPING POWER BEING USED FOR ANY GIVEN APPLICATION IS NOT KNOWN BY THE CHUCK MANUFACTURER.

THERE IS THE POSSIBILITY OF THE WORK PIECE BECOMING INSECURELY GRIPPED DUE TO THE INFLUENCE OF CENTRIFUGAL FORCE UNDER CERTAIN CONDITIONS. THE FACTORS INVOLVED INCLUDE:

a. TOO HIGH A SPEED FOR A PARTICULAR APPLICATION.

b. WEIGHT AND TYPE OF GRIPPING JAWS IF NON-STANDARD.

c. RADIUS AT WHICH GRIPPING JAWS ARE OPERATING IS INCORRECT.

d. CONDITION OF CHUCK IS INADEQUATE LUBRICATED.

e. THE STATE OF BALANCE IS NOT CORRECT.

f. THE GRIPPING FORCE APPLIED TO THE WORK PIECE IN THE STATIC CONDITION IS INADEQUATE.

g. MAGNITUDE OF THE CUTTING FORCES INVOLVED ARE TOO GREAT.

h. THE WORK PIECE IS GRIPPED INCORRECTLY.

CAREFUL ATTENTION MUST BE PAID TO THESE FACTORS. AS THEY VARY WITH EACH PARTICULAR APPLICATION, A MANUFACTURER CANNOT PROVIDE SPECIFIC FIGURES FOR GENERAL USE, THE FACTORS INVOLVED BEING OUTSIDE HIS CONTROL.

1.3 GENERAL SAFETY RULES

(1) DO NOT GRIP A COMPONENT WITH GREASE OR OIL ON IT.

GRIP ALL COMPONENTS FIRMLY.

DO NOT ATTEMPT TO HOLD COMPONENTS THAT ARE TOO AWKWARD OR TOO DIFFICULT TO HOLD .

DO NOT HOLD COMPONENTS THAT ARE TOO HEAVY FOR THE MACHINE.

KNOW HOW TO HOLD COMPONENTS PROPERLY WHEN LIFTING.

(2) BE SURE TO CLEAN OIL OR GREASE FROM HAND TOOLS, LEVERS AND HANDLES.

BE SURE THERE IS ENOUGH ROUGHNESS ON THE SURFACE OF THE HAND TOOL OR LEVER HANDLE FOR PROPER SAFE HAND CONTACT.

(3) GRIP HAND TOOLS AND LEVER HANDLES FIRMLY.

ALWAYS CHOOSE THE PROPER HAND TOOL AND APPROPRIATE GRIP POSITION ON THE LEVER HANDLE.

DO NOT USE HAND TOOLS OR LEVER HANDLES IN AN AWKWARD POSITION.

DO NOT APPLY EXCESSIVE FORCE.

(4) DO NOT ALLOW TURNING OR HAND TOOLS TO BE CAUGHT IN THE CHUCK OR OTHER HOLDING DEVICE.

(5) DO NOT USE BROKEN, CHIPPED OR DEFECTIVE TOOLS.

(6) BE SURE WORK PIECE CANNOT MOVE IN CHUCK OR OTHER HOLDING DEVICE.

(7) BEWARE OF IRREGULAR SHAPED WORK PIECES.

(8) BEWARE OF LARGE BURRS ON WORK PIECES.

(9) ALWAYS SELECT THE CORRECT TOOL FOR THE JOB.

(10) DO NOT RUN THE MACHINE UNATTENDED.

(11) DO NOT USE TOOLS WITHOUT HANDLES.

(12) ALWAYS SUPPORT THE WORK PIECE AS NECESSARY USING CHUCKS, STEADIES AND CENTERS.

(13) CORRECTLY LOCATE TOOL IN SOCKET HEADS AND SCREW SLOTS.

(14) BEWARE OF OBSTRUCTIONS THAT PREVENT COMPLETELY TIGHTENING THE SCREWS - ENSURE SCREW IS TIGHT.

(15) DO NOT RUSH WORK.

(16) NEVER SUBSTITUTE THE WRONG SIZE TOOLS IF THE CORRECT SIZED TOOL IS NOT AVAILABLE OR CANNOT BE LOCATED IN THE SHOP.

(17) DO NOT MOVE GUARDS WHILE LATHE IS UNDER POWER.

(18) DO NOT PLACE HAND OR BODY IN PATH OF MOVING OBJECTS.

BEWARE OF MOVING LATHE PARTS THAT CAN FALL.

BEWARE OF WHERE YOU ARE MOVING YOUR HAND OR BODY IN RELATIONSHIP TO THE LATHE.

BEWARE OF HOLDING A TOOL OR OTHER PARTS INSERTED IN OR ATTACHED TO THE CHUCK OR WORK PIECE.

BEWARE OF HANDS OR OTHER PARTS OF THE BODY THAT MAY IN POSITION TO BE HIT BY A CHUCK OR WORK PIECE.

(19) BEWARE OF ACCIDENTALLY MOVING LEVERS, CLUTCHES (WHERE APPLICABLE) OR TURNING THE POWER ON.

(20) KNOW THE FUNCTION OF EACH AND EVERY CONTROL.

(21) NEVER PLACE HAND ON CHUCK OR WORK PIECE TO STOP ROTATION OF THE SPINDLE.

(22) ON MACHINES WITH CLUTCH DRIVE MAKE SURE CLUTCH IS COMPLETELY DISENGAGED ON STOOPING, AND KEPT PROPERLY ADJUSTED.

(23) MAKE SURE POWER HAS BEEN TURNED OFF WHEN LATHE IS UNUSED FOR SOMETIME.

(24) ALLOW CHUCK TO STOP BEFORE ADJUSTING,

(25) DO NOT ALLOW DISTRACTIONS TO INTERFERE WITH LATHE OPERATIONS.

DO NOT OPERATE LATHE WHILST TALKING.

(26) BEWARE OF LATHE DANGERS WHEN ATTENDING TO OTHER ASPECTS OF LATHE OPERATION. E.G. WHILST OPERATING TAILSTOCK.

(27) BEWARE OF LOOSE CLOTHING NEAR THE ROTATING PARTS OF THE LATHE.

(28) BEWARE OF LOOSE HAIR NEAR THE ROTATING PARTS OF THE LATHE.

(29) BEWARE OF PERFORMING ANOTHER OPERATION WHILE IN CLOSE PROXIMITY TO ROTATING PARTS ON THE LATHE.

(30) ENSURE FILING AND DEBURRING OPERATIONS ARE COMPLETED AWAY FROM THE LATHE.

(31) BE SURE CLUTCH IS IN NEUTRAL POSITION WHEN PLACING GAUGES ON COMPONENTS GRIPPED IN THE CHUCK.

(32) BE SURE MOTOR IS NOT RUNNING WHEN USING GAUGES ON THE MACHINE.

(33) ALWAYS WEAR THE APPROPRIATE PROTECTION BEFORE OPERATING THE LATHE.

ALWAYS WEAR THE CORRECT PROTECTION BEFORE OPERATING THE LATHE.

NEVER REMOVE PROTECTION FOR EVEN A SHORT TIME WHEN OPERATING THE LATHE.

WEAR PROTECTIVE DEVICES CORRECTLY.

KNOW THE CORRECT WAY TO WEAR PROTECTIVE DEVICES.

(34) BEWARE OF SWARF AND CHIPS FLYING FROM THE LATHE.

(35) KEEP PROTECTIVE GUARDS AT THE POINT OF OPERATION.

(36) a) WHEN THE CHUCK AND WORK PIECE ARE IN MOTION NEVER REACH OVER, UNDER OR AROUND A WORK PIECE TO MAKE AN ADJUSTMENT.

b) NEVER REACH OVER, UNDER OR AROUND A WORK PIECE RETRIEVE ANYTHING.

c) BEWARE OF WHERE YOU LEAVE YOUR TOOLS DURING SET UP.

d) NEVER REACH OVER, UNDER OR AROUND THE WORK PIECE TO MOVE HAND TOOLS TO ANOTHER .

e) NEVER REACH OVER, UNDER OR AROUND THE WORK PIECE TO TIGHTEN SCREWS ETC.

f) NEVER REACH OVER, UNDER OR AROUND WORK PIECE TO REMOVE SWARF.

(38) KNOW THE PROPER PROCEDURE FOR APPLYING FORCE.

NEVER APPLY FORCE FROM AN AWKWARD POSITION.

(39) NEVER MOUNT A WORK PIECE TOO LARGE FOR THE LATHE.

(40) USE THE CORRECT LIFTING EQUIPMENT NECESSARY FOR HANDLING WORK PIECES.

(41) NEVER APPLY UNDUE FORCE ON HANDLES OR LEVERS.

(42) SECURE ALL WORK PIECES.

(43) SECURE ALL JAWS, NUTS, BOLTS AND LOCKS.

(44) ALWAYS USE THE CORRECT EQUIPMENT.

(45) NEVER TAKE DEPTH OF CUTS BEYOND MACHINE'S CAPABILITY,

NEVER USE EXCESSIVE FEED RATES.

(46) NEVER USE EXCESSIVE FORCE IN POLISHING, FILING AND DEBURRING.

(47) ALWAYS USE THE PROPER HAND TOOL TO REMOVE SWARF.

NEVER HURRY WHEN REMOVING SWARF.

BEWARE OF SWARF WRAPPED AROUND THE CHUCK OR WORK PIECE.

(48) BEWARE OF TOOL/LATHE PARTS FALLING ONTO CONTROLS.

(49) ONLY USE T-WRENCH WHEN LOCKING WORKPIECE.

(50) DO NOT APPLY CHISELS OR EMERY PAPER BY HAND TO THE WORKPIECE.

1.4 WARNING SIGN AND MARKS ON THE MACHINE

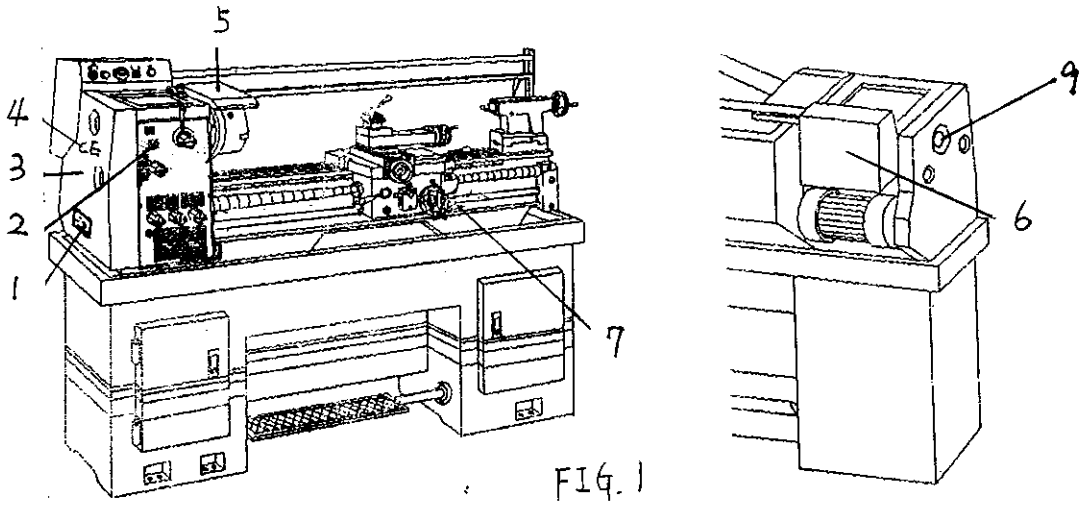


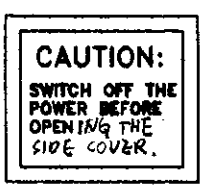
FIG. 1

1 MODEL:
SERIAL NO.
DATE:
MADE IN TAIWAN, R.O.C.

MACHINE IDENTIFICATION.

2 

DO NOT MOVE SPEED RANGE SELECTOR KNOB WHILST THE SPINDLE IS ROTATING.

3 

SWITCH OFF THE POWER BEFORE OPENING THE SIDE COVER.

4 

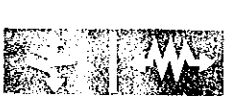
CE MARK.

5 

DO NOT TOUCH TOOLING, CHUCK OR WORKPIECE WHEN SPINDLE IS REVOLVING.

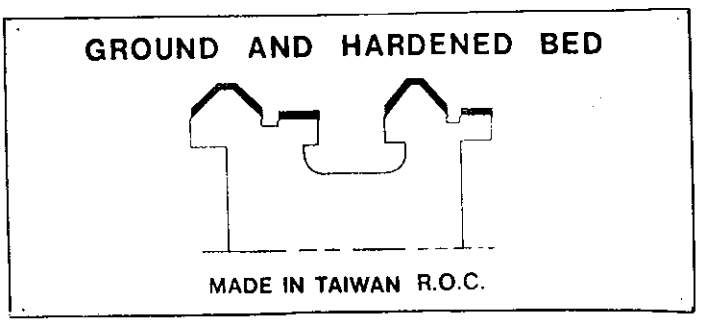
6 

ELECTRICITY AREA.

7 

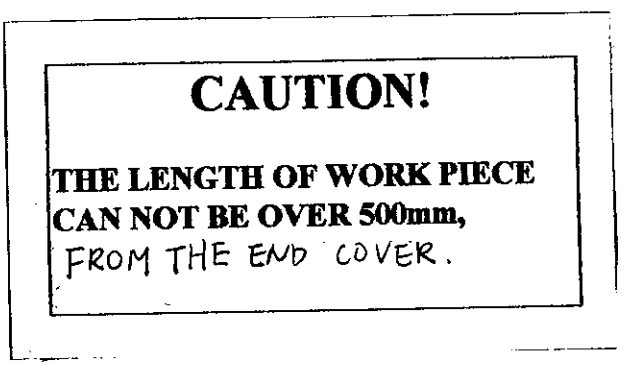
AUTOMATIC FEED DIRECTION INDICATE.

8



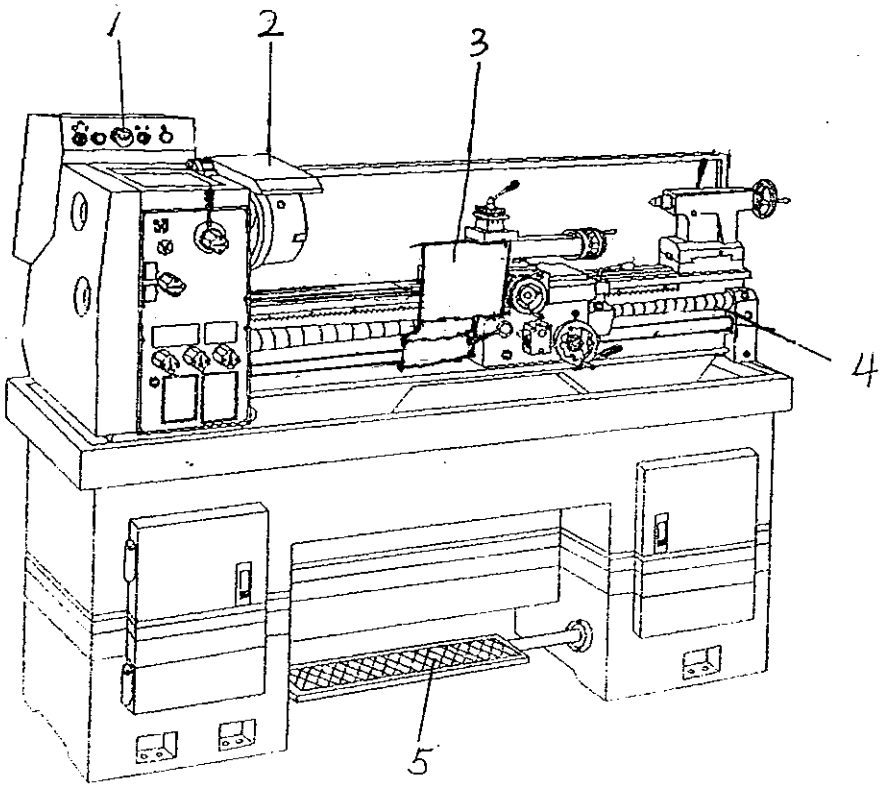
GROUND AND HARDENED BED LABEL.

9



THE LENGTH OF WORK PIECE
CAN NOT BE OVER 500mm, FROM
THE END COVER.

1.5 SAFETY DEVICE AND INSPECT



1. EMERGENCY STOP BUTTON

2. CHUCK GUARD

3. LEADSCREW & FEED ROD PROTECTION COVER

4. FOOT BRAKE PEDAL

   (1) AFTER STEP ON THE FOOT BRAKE PEDAL, THE SPINDLE WILL STOP ROTATING AND POWER WILL BE OFF.

   (2) THE SPINDLE WILL ROTATE, AFTER SWITCH "FORWARD & REVERSE LEVER" TO MIDDLE POSITION AND RESTART THE POWER.

5. CARRIAGE GUARD

INSPECT BEFORE OPERATING

1. THE POWER WILL BE OFF AND SPINDLE STOP, WHEN PRESS EMERGENCY STOP BUTTON.

2. THE POWER WILL BE OFF AND SPINDLE WILL NOT ROTATE WHEN CHUCK GUARD IS LIFTED.

3. AFTER STEP ON THE FOOT BRAKE PEDEL, THE SPINDLE WILL STOP RETAING IMMEDIATELY AND POWER WILL BE OFF.

2 SUMMARY OF THE MACHINE

2.1 BASIC DESCRIPTION OF THE MACHINE AND PART NAMES

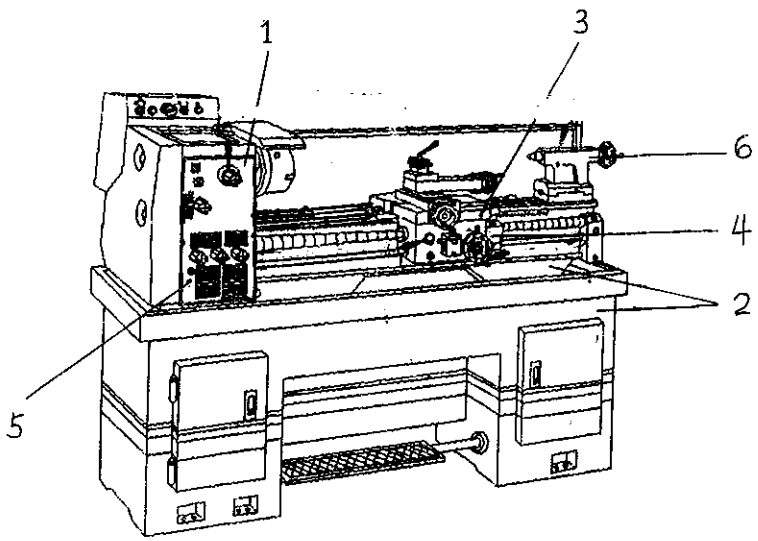


FIG. 3

1. HEADSTOCK

THE HEADSTOCK IS A ONE-PIECE SPECIAL (FC-25) CAST IRON CASTING FITTED WITH ADJUSTING SCREWS FOR PROPER ALIGNMENT TO THE BEDWAYS AND FASTENED TO THE BED WITH SIX SCREWS. THE SPINDLE IS SUPPORTED ON TWO TAPER ROLLER BEARINGS FOR MAXIMUM RIGIDITY AND PRECISION, AND THE OTHER GEARS SHAFTS OPERATE ON BALL BEARINGS. THE COMPLETE GEAR TRAIN THE SELF LUBRICATED BY SPLASH SYSTEM.

2. BED AND FLOOR STAND

THE BED IS MADE OF SPECIAL CAST IRON (FC-25) IN ONE-PIECE CASTING AND HAS A BOX-SECTION MEMBER. THE BEDWAYS IS PRECISION GROUND AND HAS BEEN SUBJECTED TO HIGH FREQUENCY HEAT-TREATMENT (HRC 55).

THE FLOOR STAND IS SEPARATED FROM THE BED. THE FLOOR STAND IS READY TO REMOVE, DISENGAGE AND REFIT, THERE ARE 6 SETS OF SCREW TO ADJUST THE MACHINE LEVEL..

3. SADDLE

THE WIDE SADDLE INSURES MAXIMUM RIGIDITY AGAINST STRESSES OF HEAVY CUTTING LOADS.
THE CROSS-SLIDE AND COMPOUND SLIDES ARE FITTED TO THE SADDLE.

WHEN FITTED WITH INCH SCREW, THE CROSS SLIDE MOVES .200" ON DIAMETER FOR EACH REVOLUTION OF THE HAND WHEEL AND THE DIAL IS GRADUATED IN .001". THE TRAVEL OF THE CROSS SLIDE IS 172MM (6-3/4"). THE COMPOUND SLIDE TRAVEL IS 92MM (3-5/8").

4. APRON

THE APRON IS A HEAVY DUTY DOUBLE WALL CASTING AND ALL THE SHAFTS AND GEARS ARE SUPPORTED AT BOTH ENDS. IT CONTAINS ALL THE NECESSARY GEARING AND CONTROLS TO TRANSMIT POWER FEED FOR LONGITUDINAL AND CROSS MOVEMENTS AS WELL AS FOR THREAD CUTTING. THE CONTROLS ARE INTERLOCKED TO PREVENT SIMULTANEOUS ENGAGEMENT OF THE FEEDS AND THREADING.

5. GEAR BOX

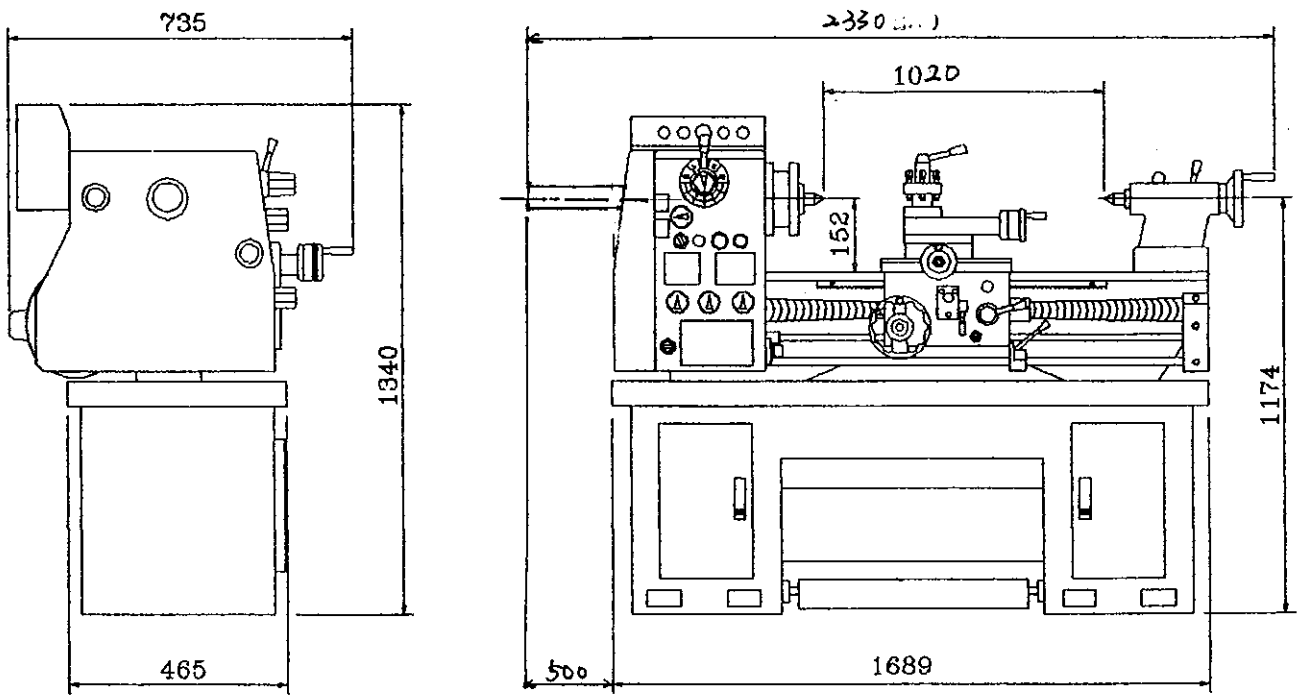
THIS GEAR BOX ALLOWS SELECTION OF METRIC AND INCH THREADS AS WELL AS FEEDS.

6. TAILSTOCK

THE TAILSTOCK IS ALSO MADE OF CAST IRON (FC 25) RUGGED AND COMPACT. IT IS EASY TO MOVE AND ADJUST. IT CAN BE KEPT CLOSE TO THE HEAD STOCK WITHOUT THE INTERFERENCE FOR THE OPERATION OF TOOL POST.

THE LATHE IS MANUFACTURED TO JIS STANDARDS AND ALL SLIDING SURFACES ARE PRECISION GROUND.

2.2 DIMENSION AND WORK RANGE OF MACHINE



2.3 MACHINE SPECIFICATIONS

2.3.1 SPECIFICATION

ITEM	SPECIFICATION
SWING OVER BED	339MM (13-3/8")
SWING OVER SADDLE	220MM (8-21/32")
SWING OVER GAP	496MM (19-1/2")
DISTANCE BETWEEN CENTERS	1020MM (40")
WIDE OF BED	195MM (7-11/16")
HOLE THROUGH SPINDLE	38.5MM (1-1/2")
TAPER IN SPINDLE NOSE BUSH	M.T. #5
TAPER IN TAILSTOCK BARREL	M.T. #3
NUMBER OF SPINDLE SPEEDS	12
RANGE OF SPINDLE SPEEDS	54-2000 R.P.M.
TOTAL TRAVEL OF TOP SLIDE	92MM (3-5/8")
TOTAL TRAVEL OF CROSS SLIDE	172MM (6-3/4")
TOTAL TRAVEL OF TAILSTOCK BARREL	102MM (4")
NUMBER OF METRIC PITCHES	27
RANGE OF METRIC PITCHES	0.2-0.75MM
NUMBER OF INCH THREADS	40
RANGE OF INCH THREADS	4-112 T.P.I.
LEAD SCREW DIAMETER & PITCHES	7/8" (22MM) X 8 T.P.I. OR PITCH 3MM

RANGE OF CROSS FEEDS	0.006MM-0.157MM (0.0002"-0.0063")
RANGE OF LONGITUDINAL FEEDS	0.033MM-0.924MM (0.0013"-0.0364")
MOTOR HORSE POWER	3HP
NET WEIGHT	550 KGS.
MEASUREMENT	233X73.5X134cm

2.3.2 STANDARD ACCESSORIES

1. THREAD CUTTING INDICATOR 1 PC.
2. CENTER SLEEVE (M.T. #5) 1 PC.
3. CENTER (M.T. #3) 2 PC.
4. TOOL POST WRENCH 1 PC.
5. METRIC CHANGE GEAR 1 SET.
6. BACKING PLATE 1 PC.
7. 4-WAYS TOOL POST 1 PC.
8. TOOL BOX & TOOL KITS 1 SET.
9. CHIP TRAY 1 PC.
10. MOTOR PULLEY & BELT 1 SET.
11. 3-JAW SCROLL CHUCK 6" 1 PC.
12. ELECTRIC MOTOR 3HP (3PH) 1 PC.
13. COOLANT PUMP & FITTINGS 1 SET.
14. FULL LENGTH SPLASH GUARD 1 PC.
15. CHUCK GUARD 1 PC.
16. FLOOR STAND 1 PC.
17. FOOT BRAKING EQUIPMENT 1 SET.
18. LEAD SCREW & FEED ROD COVER 1 SET.

2.3.3 SPECIAL ACCESSORIES :

1. STEADY REST 1 PC.
2. FOLLOW REST 1 PC.
3. CAMLOCK FACE PLATE (10" OR 12") 1 PC.
4. 4-JAW INDEPENDENT CHUCK 8" 1 PC.
5. ELECTRIC MOTOR 2HP (1ph OR 3ph) 1 PC.
6. DRILL CHUCK 1/2". 1 PC.
7. ROLLING CENTER MT#3. 1 PC.
8. SINGLE TOOL POST 1 PC.
9. MICROMETER TYPE CARRIAGE STOP 1 PC.
10. 4-POSITION CROSS SLIDE STOP 1 PC.
11. MACHINE LIGHT 1 PC.
12. QUICK CHANGE TOOL POST 1 SET.
13. CAMLOCK BACKING PLATE. 1 PC.
14. 5C HAND WHEEL COLLECT CLOSER. 1PC.
15. 5C LEVER COLLECT CLOSER. 1PC.
16. TAPER ATTACHMENT 1SET.

2.4 OPERATOR POSITION AND NOISE LEVEL

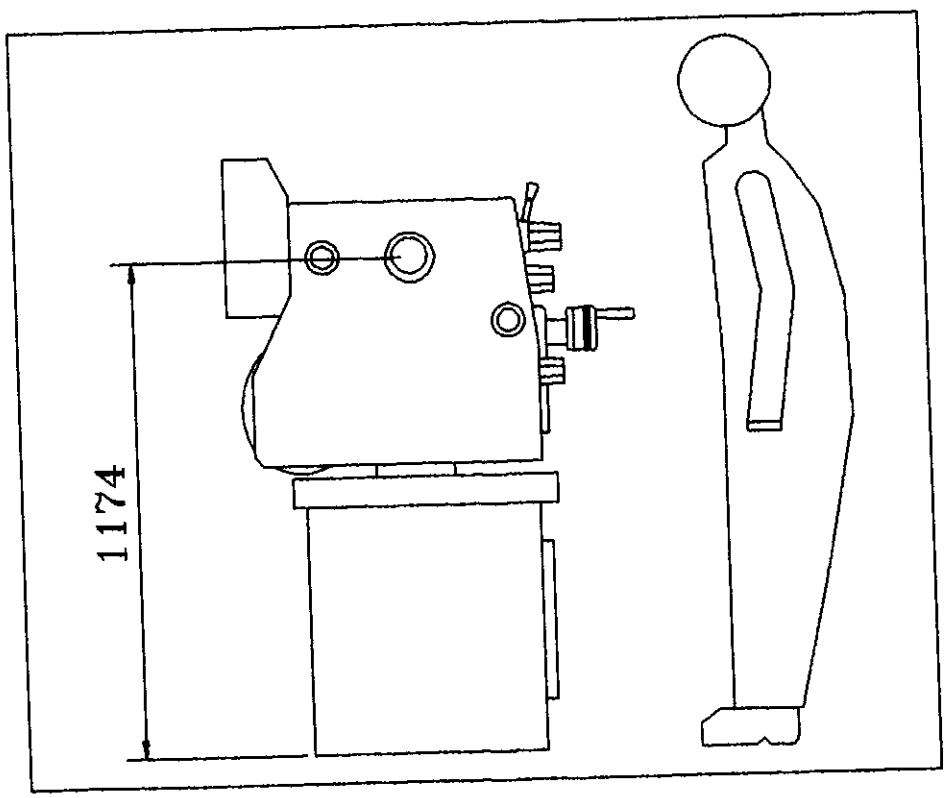


FIG. 4

NOISE LEVEL : LESS THAN 80 dB

IT A DISTANCE OF 1 METER FROM THE SURFACE OF THE MACHINERY AND AT A HEIGHT OF 1.6 METER FROM FLOOR.

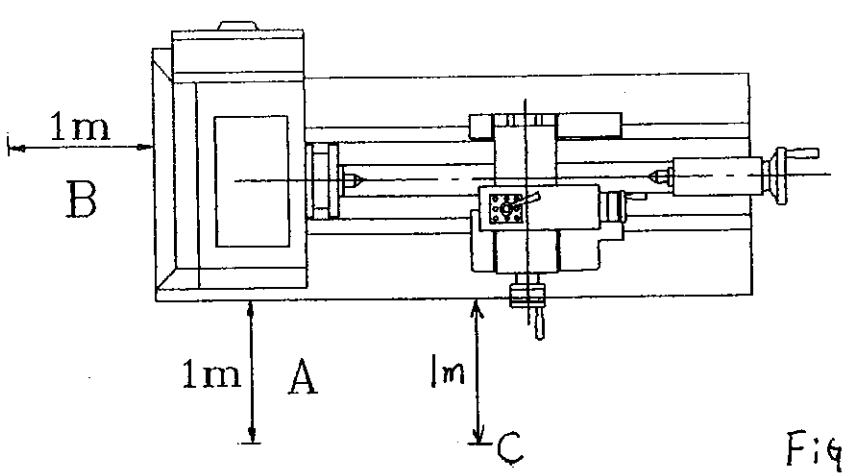
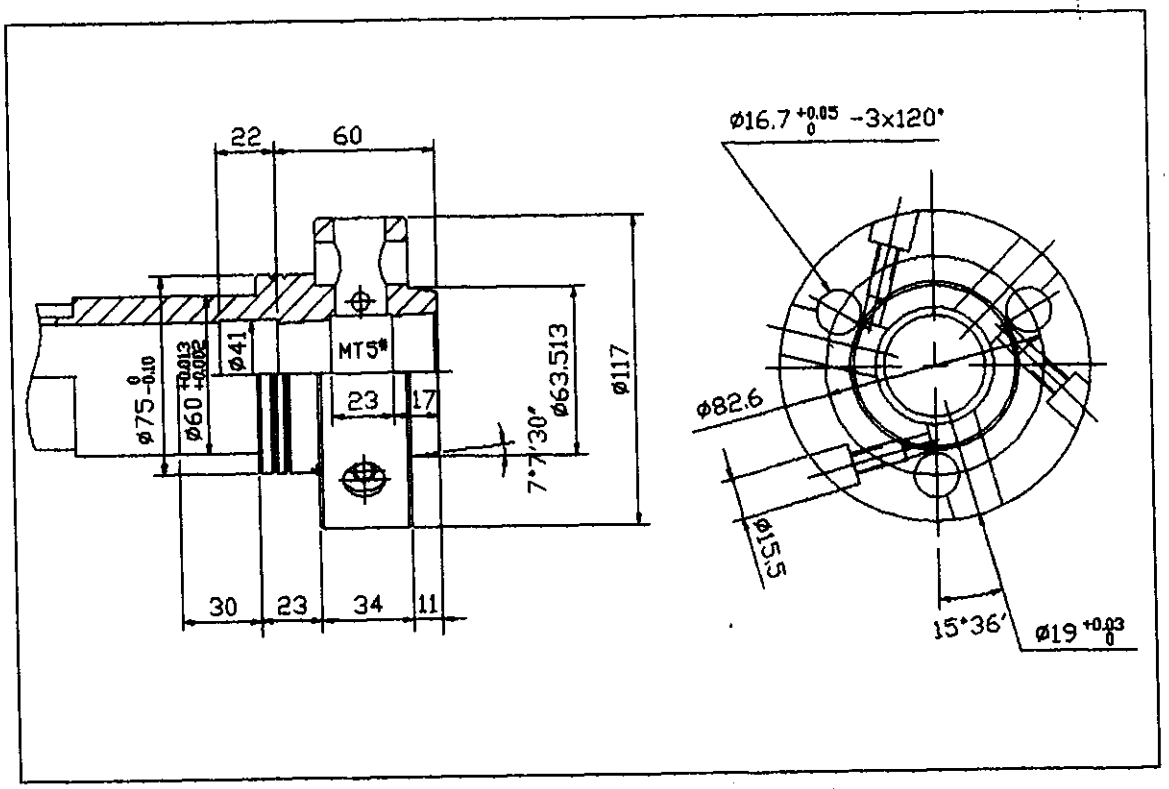


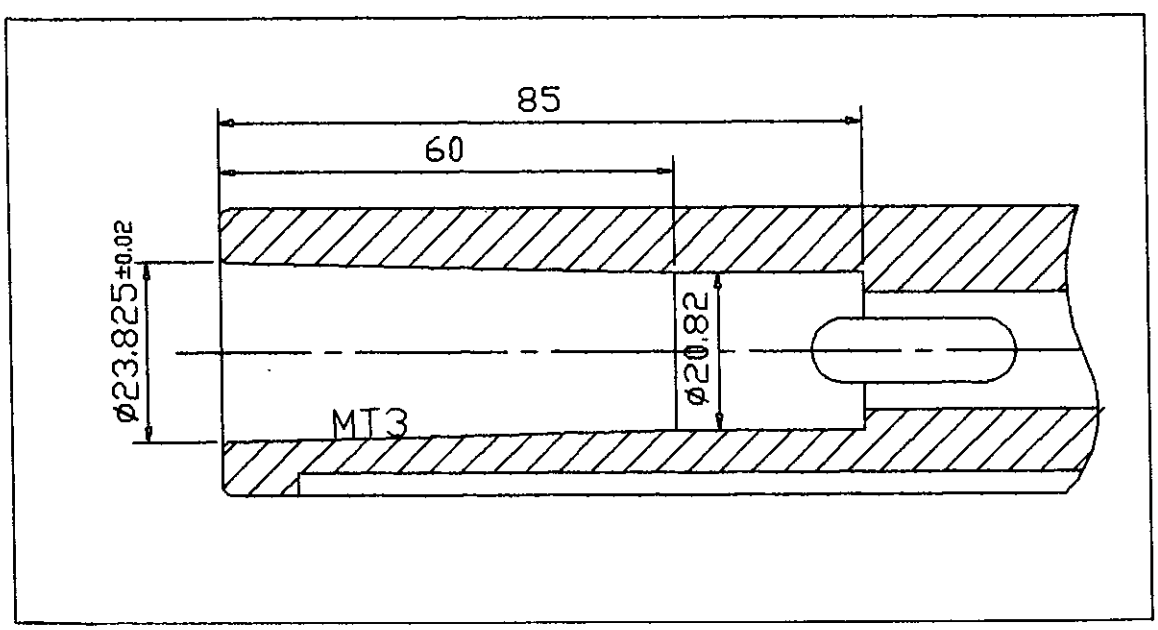
Fig. 5

2.5 SPINDLE NOSE AND TAILSTOCK QUILL TAPER DRAWING

2.5.1 SPINDLE NOSE DETAIL

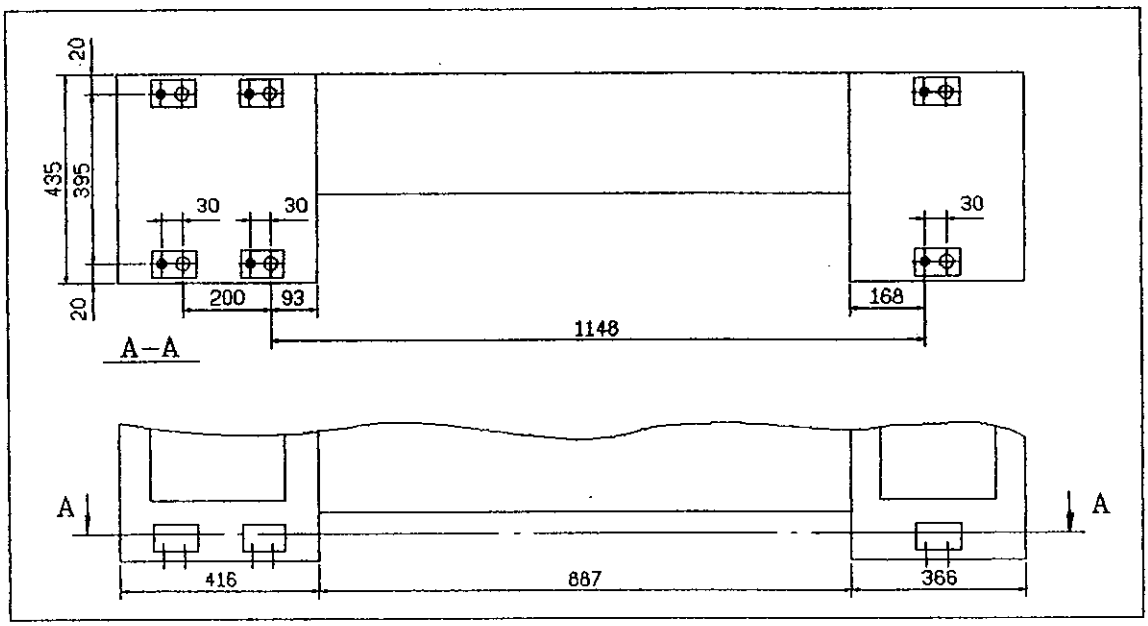


2.5.2 QUILL NOSE DETAIL



3 PREPARATIONS BEFORE INSTALLING THE MACHINE

3.1 FOUNDATION REQUIREMENT



3.2 POWER REQUIREMENTS

VOLTAGE	STEADY STATE VOLTAGE 0,9 ... 1,1 OF NOMINAL VOLTAGE.
FREQUENCY	0,99 ... 1,01 OF NORMAL FREQUENCY CONTINUOUSLY, 0,98 ... 1,02 SHORT-TIME.
HARMONICS	HARMONIC DISTORTION NOT TO EXCEED 10% OF THE TOTAL r.m.s. VOLTAGE BETWEEN THE LIVE CONDUCTORS FOR THE SUM OF THE 2nd THROUGH 5th HARMONIC.
VOLTAGE UNBALANCE IN 3-PHASE SUPPLIES	NEITHER THE VOLTAGE OF THE NEGATIVE SEQUENCE COMPONENT NOR THE VOLTAGE OF THE ZERO SEQUENCE COMPONENT SHALL EXCEED 2% OF THE POSITIVE SEQUENCE COMPONENT.
VOLTAGE IMPULSES	NOT TO EXCEED 1,5 MS IN DURATION WITH A RISE / FALL TIME BETWEEN 500 NS AND 500 us AND A PEAK VALUE NOT MORE THAN 200% OF THE RATED r.m.s. SUPPLY VOLTAGE.
VOLTAGE INTERRUPTION	SUPPLY INTERRUPTED OR AT ZERO VOLTAGE FOR NOT MORE THAN 3 ms AT ANY RANDOM TIME IN THE SUPPLY CYCLE. THERE SHALL BE MORE THAN 1 S BETWEEN SUCCESSIVE INTERRUPTIONS.
VOLTAGE DIPS	VOLTAGE DIPS SHALL NOT EXCEED 20 % OF THE PEAK VOLTAGE OF THE SUPPLY FOR MORE THAN ONE CYCLE. THERE SHALL BE MORE THAN 1 S BETWEEN SUCCESSIVE DIPS.

3.3 ENVIRONMENT

3.3.1 TEMPERATURE : NORMAL TEMPERATURE WITHIN +10 °C TO 38 °C.

3.3.2 HUMIDITY : 30% TO 95% .

3.3.3 KEEP AWAY FROM GAS, CHEMICAL, OR EXPLOSIVE STAFF.

3.3.4 KEEP AWAY FROM ELECTRICAL MAGNETIC INTERFERENCE.

3.3.5 OTHERS: KEEP AWAY FROM ASHES, ACID, OR SALTY AREA.

4 TRANSPORT AND INSTALLATION

4.1 TRANSPORT

4.1.1 MACHINE WEIGHT

THE WEIGHT OF 18DF LATHE IS : 550 KGS

ALWAYS ENSURE CAPACITY OF EQUIPMENT IS ADEQUATE BEFORE ATTEMPTING TO LIFT.

4.1.2 PREPARATION AND SAFETY CHECKS

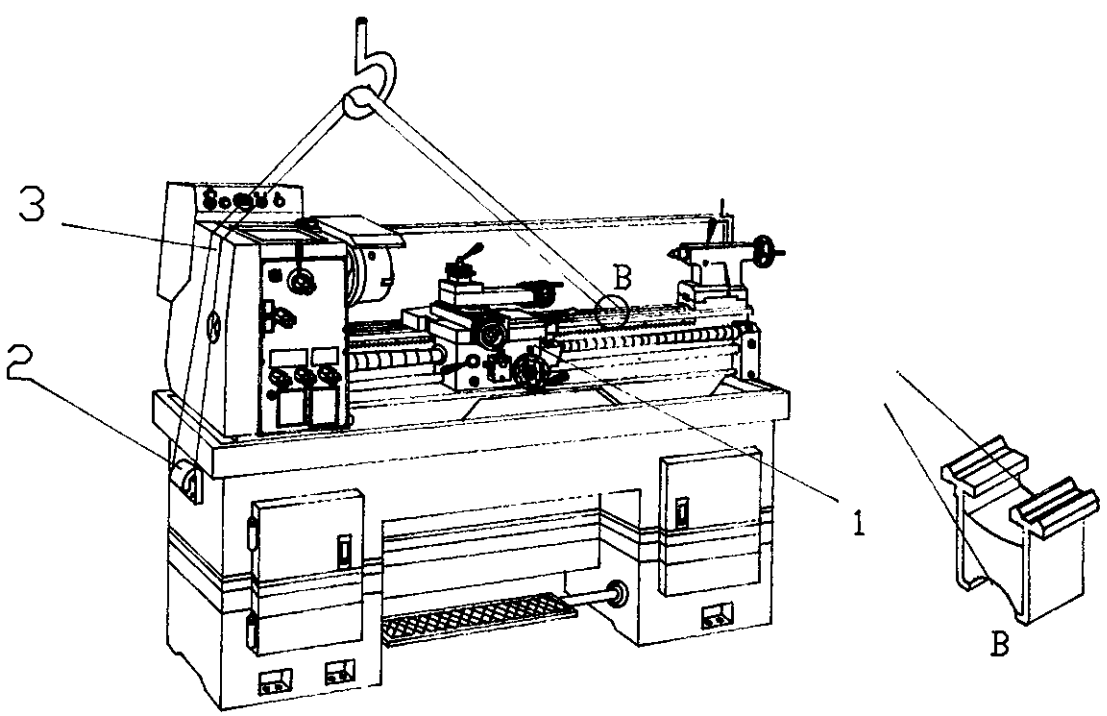
1. REMOVE ALL ITEMS OF LOOSE EQUIPMENT .
2. CLAMP TAIL STOCK SECURELY AT THE TAIL OF THE BED.
3. CLAMP SADDLE TO BED.
4. ENSURE EYEBOLTS, SHACKLE PINS AND SECURING SCREWS OF LIFTING EQUIPMENT ARE CORRECTLY TIGHTENED.
5. ONLY USE THE CORRECT EQUIPMENT SUPPLIED.

4.1.3 LIFTING

1. SLIDE THE CARRIAGE NEAR TO HEADSTOCK (FIG. 6 -1).
2. LET CABLE THROUGH THE HANGER (FIG. 6-B), THE OTHER SIDE OF CABLE IS HOOKED UP. (FIG. 6-2)
3. CAREFULLY LIFT THE LATHE CLEAR OF GROUND AND IF NECESSARY REPOSITION THE SADDLE TO ACHIEVE BALANCE BEFORE LIFTING FURTHER.

NOTE : a. THE CABLE SHOULD TAKE THE WEIGHT AT LEAST 1 TON.

b. TAKING SOME PROTECTIONS (CLOTH OR CARD BOARD) ON SIDE COVER. (FIG. 6-3)



4.2 INSTALLATION

4.2.1 CLEANING

ALL MACHINE SURFACES ARE COVERED WITH A ANTI RUST PRESERVATIVE WHICH MUST BE THOROUGHLY CLEANED OFF BEFORE MOVING ANY PARTS OF THE LATHE. ONLY MILD SOLVENT AND SOFT RAGS MUST BE USED FOR CLEANING.

NOTE: 1. SPECIAL CARE MUST BE TAKEN TO COMPLETELY CLEAN THE LEAD SCREW, FEED SHAFT, RACK AND PINION.

2. NEVER USE LACQUER, THINNER, GASOLINE OR OTHER INFLAMMABLE LIQUIDS AS A CLEANING FLUID.

4.2.2 LEVEL ADJUSTMENT

1. IT IS MOST IMPORTANT TO SET THE LATHE LEVEL AND FIRM IN ORDER TO PERFORM ACCURATELY. FOR A BEST RESULT, IT IS SUGGESTED TO MOUNT THE LATHE ON A CONCRETE FLOOR.

2. IF THE MACHINE CAN NOT BE ANCHORED TO A CONCRETE FLOOR IT IS RECOMMENDED TO INSTALL THE LATHE ON A HEAVY STEEL PLATE FITTED WITH LEVELING SCREWS SO AS TO PROPERLY ALIGN AND LEVEL THE MACHINE.

3. IF THE LATHE IS TO BE MOUNTED ON A BENCH, FIRST MAKE SURE THAT THE BENCH, IS PROPERLY LEVELED TO THE REQUIRED TOLERANCE.

4.2.3 ELECTRICAL CONNECTIONS

THE ELECTRICAL EQUIPMENT SUPPLIED IS DIFFERENT DEPENDING ON THE MODELS AND YOUR REQUIREMENTS. THE MACHINE IS READY FOR INSTALLATION ON 3 PHASE OR SINGLE PHASE, 50 OR 60 CYCLES, AC. VOLTAGE AS YOU REQUIRE.

NOTE: 1. BEFORE CONNECTING TO A POWER SOURCE ESTABLISH MOTOR VOLTAGE, PHASE AND CYCLES.

2. MADE SURE THAT POWER SUPPLY IS PROPERLY FUSED AND GROUNDED.

3. MOTOR ROTATION MUST BE CLOCKWISE WHEN VIEWED FROM THE PULLEY END. IF THE MOTOR TURNS IN THE WRONG DIRECTION INTERCHANGE THE PHASES FOR CORRECTION.

4.2.4 CHUCK MOUNTING

WHEN FITTING CHUCKS OR FACEPLATES, FIRST ENSURE THAT THE SPINDLE NOSE AND CHUCK TAPERS ARE CLEAN; MOUNT THE CHUCK AND ASCERTAIN THAT THE CAMS LOCK IN THE CORRECT POSITION. WHEN MOUNTING A NEW CHUCK IT MAY BE NECESSARY TO RESET THE CAMLOCK STUDS (A). TO DO THIS, REMOVE THE CAPHEAD LOCKING SCREWS (B) AND SET EACH STUD SO THAT THE SCRIBED RING (C) IS FLUSH WITH THE REAR FACE OF THE CHUCK AND WITH THE CIRCULAR SCALLOP IN LINE WITH THE LOCKING SCREW HOLE MAKE SURE THE RATED MAX. RPM OF THE CHUCK IS SUITABLE (SEE INSET).

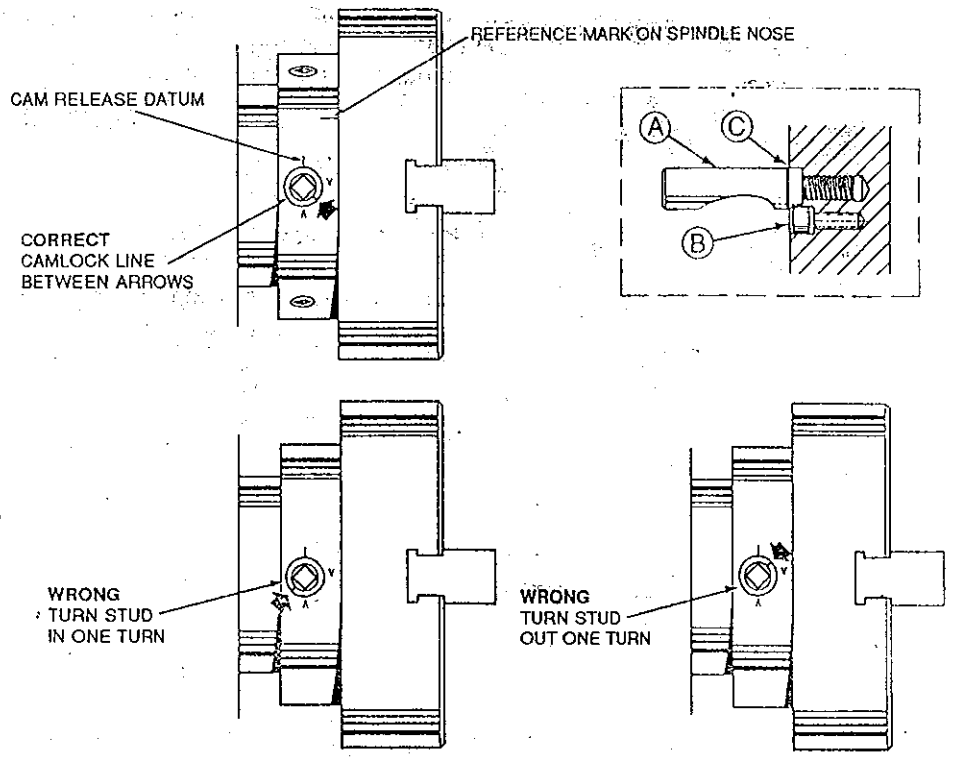
NOW REMOUNT THE CHUCK OR FACEPLATE ON THE SPINDLE NOSE AND TIGHTEN THE SIX CAMS IN TURN. WHEN CORRECTLY TIGHTENED THE CAMLOCK LINE ON EACH CAM SHOULD BE BETWEEN THE TWO "V" MARKS ON THE SPINDLE NOSE.

IF ANY OF THE CAMS DO NOT TIGHTEN FULLY WITHIN THESE MARKS, REMOVE THE CHUCK OF FACEPLATE AND RE-ADJUST THE STUD AS INDICATED IN THE DIAGRAM.

ONCE A CHUCK HAS BEEN CORRECTLY FITTED IT MAY BE STAMPED TO ALIGN WITH THE SPINDLE REFERENCE MARK FOR SUBSEQUENT RE-MOUNTING IN THE SAME POSITION.

WARNING

1. ONLY HIGH SPEED CHUCKS TO BE USED THIS MACHINE. (MAX. 2000RPM)



5 OPERATION

5.1 SAFETY INSPECTION BEFORE OPERATION

BEFORE ATTEMPTING TO START THE MACHINE READ CAREFULLY THE LATHE OPERATING INSTRUCTIONS IN THIS MANUAL.

LATHE SAFETY

IN THE INTERESTS OF SAFETY PLEASE READ SECTION 1.1, 1.2 AND 1.3 AT THE BEGINNING OF THIS MANUAL.
SOME OF THE KEY POINTS ARE:

1. ENSURE YOU KNOW HOW TO STOP THE MACHINE BEFORE STARTING IT.

2. STOP MACHINE IMMEDIATELY ANYTHING UNEXPECTED HAPPENS

3. ENSURE SPEEDS, FEEDS AND DEPTHS OF CUT ARE COMPATIBLE WITH THE COMPONENT AND THE HOLDING DEVICES

4. DO NOT TOUCH TOOLING, CHUCK OR WORK PIECE WHEN SPINDLE IS REVOLVING.

5. WEAR AND UTILIZE SUITABLE PROTECTIVE CLOTHING AND EQUIPMENT.

5.2 CONTROL DEVICE LAYOUT

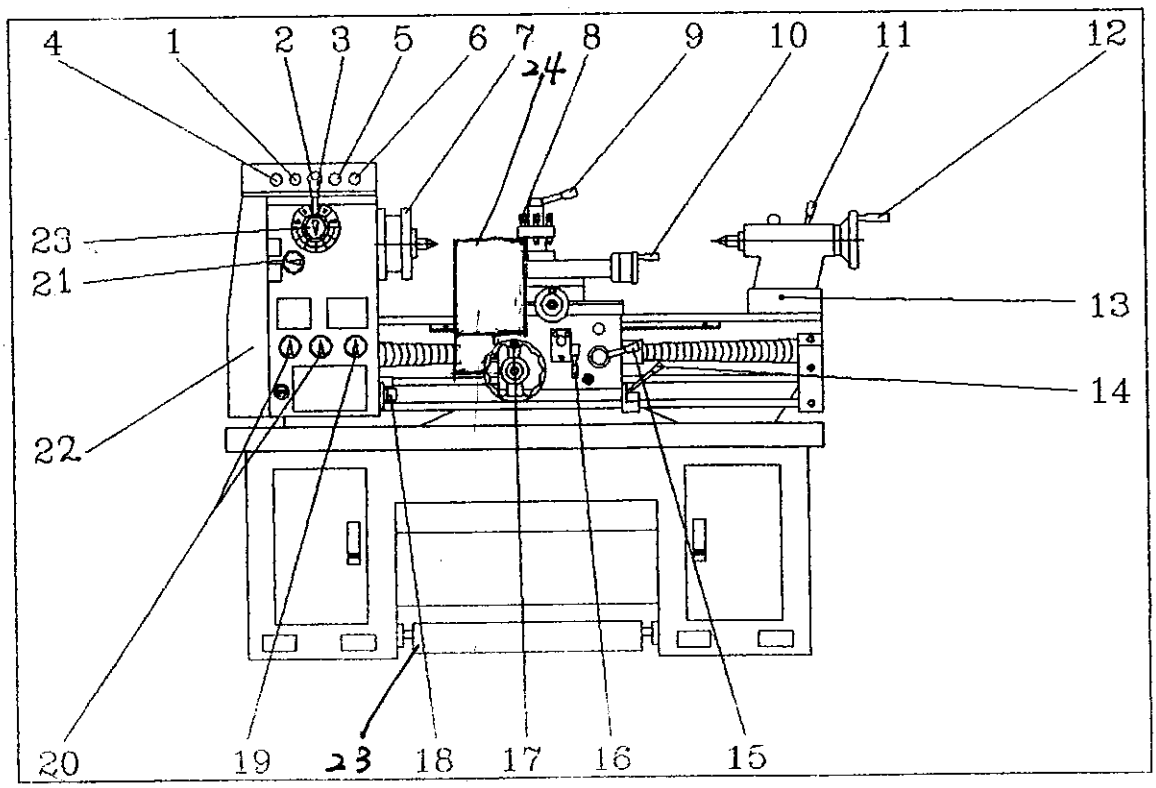


FIG. 6

01. COOLANT PUMP ON/OFF SWITCH
02. DISPLAY LIGHT
03. HIGH/LOW SPEEDS CHANGE KNOB
04. KEY SWITCH
05. EMERGENCY STOP BUTTONS
06. JOGGING BUTTONS
07. FACEPLATE
08. LOCKING BOLTS
09. CLAMPING LEVER FOR SQUARE TOOL POST
10. TOOL SLIDE HANDLE
11. TAILSTOCK CLAMPING LEVER
12. HAND WHEEL FOR TAIL STOCK QUILL MOVEMENT
13. TAILSTOCK SET OVER SCREW
14. SPINDLE FORWARD AND REVERSE CONTROL LEVER
15. LEADSCREW NUT ENGAGEMENT LEVER
16. CROSS/LONGITUDINAL FEED LEVER
17. HAND WHEEL FOR LONGITUDINAL FEEDS
18. GEAR BOX SHIFT KNOB
19. FEEDSHAFT / LEADSCREW SELECTIVE KNOB
20. GEAR BOX SHIFT LEVER
21. POSITIVE - REVERSE SELECTIVE KNOB
22. SIDE COVER
23. CARRIAGE GUARD
24. FOOT BRAKE

TO STOP THE MACHINE

(1) RETURN THE SPINDLE CONTROL LEVER TO THE NEUTRAL POSITION. (14 IN FIG., 6)

(2) PRESS EMERGENCY TO STOP. (5 IN FIG. 6)

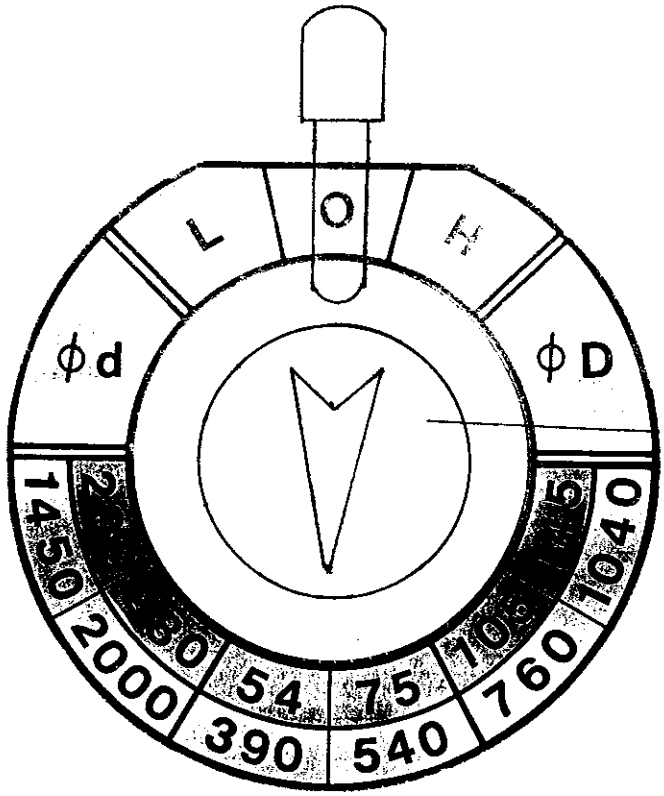
(3) SWITCH OFF THE KEYSWITCH. (4 IN FIG. 6)

(4) SWITCH MAIN ISOLATR OFF.

5.3 SPINDLE SPEED CHANGE

SPEED SELECTION

12 SPINDLE SPEEDS ARE POSSIBLE BY THE PROPER THREE GEAR SELECTIONS (2 FIG. 7) AND THE HIGH-LOW LEVER (1 IN FIG. 7) IN TWO MOTOR PULLEY RANGES.



POSITION	SPEED	R P M
D PULLEY	L	54
		105
		200
	H	390
		760
		1450
d PULLEY	L	75
		145
		280
	H	540
		1040
		2000

FIG. 7

NOTE: WHEN MESH THE INTERMEDIATE GEAR WITH SPINDLE GEAR, OPERATING UNDER "D", "d" CONDITION.

CAUTION:

DO NOT MOVE SPEED RANGE SELECTOR KNOB WHILST THE SPINDLE IS ROTATING.

SPINDLE SPEED CALCULATIONS

AS A TWO RANGE VARIABLE SPEED DRIVE IS AVAILABLE TO THE SPINDLE IT IS POSSIBLE TO MACHINE A PARTICULAR MATERIAL AT ITS OPTIMUM SURFACE SPEED, HENCE SET THE SPINDLE SPEED IN REV/MIN AND CALCULATE THE OPTIMUM POWER AVAILABLE.

THE OPTIMUM SPINDLE SPEED IS CALCULATED FROM THE FORMULAE SHOWN BELOW.

1)

$$N = \frac{S \times 1000}{\pi D} \quad \text{(METRIC)}$$

WHERE D = DIAMETER IN MM
S = CUTTING SPEED IN Metres/min
AND N = SPINDLE rev / min

2)

$$N = \frac{S \times 1000}{\pi \times D} \text{ (INCH)}$$

WHERE D = DIAMETER IN INCHES
S = CUTTING SPEED IN feet / min
AND N = SPINDLE rev/min

5.4 TO START THE MACHINE

(1) SWITCH ON THE MAIN ISOLATOR LOCATED AT THE REAR OF THE MACHINE.

(2) RELEASE THE EMERGENCY STOP BUTTON (A) ON THE FRONT OF THE HEADSTOCK.

(3) SWITCH ON THE KEY SWITCH (C).

(4) SELECT ONE OF THE SPINDLE SPEED RANGE USING THE LEVER ON THE HEADSTOCK. (SEE PREVIOUS SECTION)

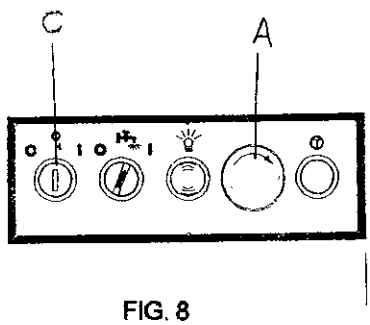


FIG. 8

5.5 SPINDLE FORWARD-REVERSE SELECTION KNOB

PULL THE SELECTIVE KNOB (14 IN FIG. 6) UP, THE MOTOR WILL BE START AND THE SPINDLE WILL GET A FORWARD ROTATION WHILE OPERATING. ON THE CONTRACT, PUSH DOWN THE SELECTIVE KNOB THE MOTOR WILL BE START AND THE SPINDLE WILL GET A REVERSE ROTATION WHILE OPERATING.

5.6 FORWARD-REVERSE SELECTION KNOB

TURN THE SELECTIVE KNOB (21 IN FIG. 6) TO RIGHT POSITION, THE LEAD SCREW WILL GET A COUNTERCLOCKWISE ROTATION OR THE FEED ROD WILL GET A CLOCKWISE ROTATION WHILE OPERATING. ON THE CONTRARY, TURN THE SELECTIVE KNOB TO LEFT POSITION, THE LEAD SCREW WILL GET A CLOCKWISE ROTATION OR FEED ROD WILL GET A COUNTERCLOCKWISE ROTATION WHILE OPERATING.

FEEDS / THREADS CHANGE KNOB (19 IN FIG. 6) IS FITTED WITH THE COVER OF GEAR BOX . TURN THE CHANGE KNOB TO RIGHT POSITION, FEED ROD WILL TURN FOR FEEDING AUTOMATICALLY. TURN THE CHANGE KNOB TO LEFT POSITION, THE LEAD SCREW WILL TURN, THREADS IS READY.

5.7 THREADING

BY PROPER LOCATION OF THE GEAR BOX SPEEDS CHANGE KNOB AND GEAR BOX SPEEDS SELECTIVE DISH (18,20 IN FIG. 6), INCH AND METRIC THREADS AND CORRESPONDING FEEDS ARE POSSIBLE. THE THREAD CUTTING CHARTS GIVE FULL DETAILS OF THE INCH AND METRIC THREAD AVAILABLE.

5.8 HALF NUT CONTROL LEVER

PUSH THE HALF NUT EVER (15 IN FIG. 6) DOWN WHEN THE LEAD SCREW IS REVOLVING TO ENGAGE THE HALF NUT FOR THREADING. PULLING THIS LEVER UP WILL DISENGAGE THE HALF NUT.

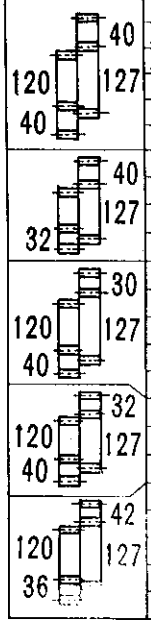
5.9 LONGITUDINAL AND CROSS FEED ENGAGEMENT LEVER

THIS IS A THREE POSITION CONTROL WITH THE MIDDLE POSITION AS NEUTRAL. PUSH THE LEVER 16 IN FIG. 6) DOWN TO ENGAGE THE CROSS FEEDS AND LIFT UP TO ENGAGE THE LONGITUDINAL FEEDS.

FEED AND THREAD TABLE FOR INCH SPECIFICATION

FOR CUTTING METRIC THREAD

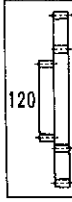
METRIC THREAD PITCH (mm)



	1	2	3	6	8
AC	6			4	
AD	3			2	
AE	1.5			1	
BD	0.75		0.6	0.5	
BE			0.3	0.25	
AC	7.5		6	5	
AD			3	2.5	
AE			1.5	1.25	
BD			0.75		
AC	4.5	4		3	
AD		2		1.5	
AE		1	0.9	0.75	
BD		0.5	0.45		
BE		0.25	0.225		
AE				0.8	
BD	0.6			0.4	
BE	0.3			0.2	
AC	7				4
AD	3.5				2
AE	1.75				1
BD			0.7		0.5
BE			0.35		0.25

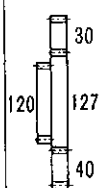
FOR CUTTING INCH THREAD

THREAD PER INCH (IN)



	1	2	3	4	5	6	7	8
AC	4	4½	5	5½	5¾	6	6½	7
AD	8	9	10	11	11½	12	13	14
AE/BC	16	18	20	22	23	24	26	28
BD	32	36	40	44	46	48	52	56
BE	64	72	80	88	92	96	104	112

RANGE OF FEED (IN)



	1	2	3	4	5	6	7	8
AC	.0468	.0416	.0374	.0340	.0325	.0312	.0288	.0267
AD	.0234	.0208	.0187	.0170	.0163	.0156	.0144	.0134
AE/BC	.0117	.0104	.0094	.0085	.0081	.0078	.0072	.0067
BD	.0058	.0052	.0047	.0043	.0041	.0039	.0036	.0033
BE	.0029	.0026	.0023	.0021	.0020	.0019	.0018	.0017

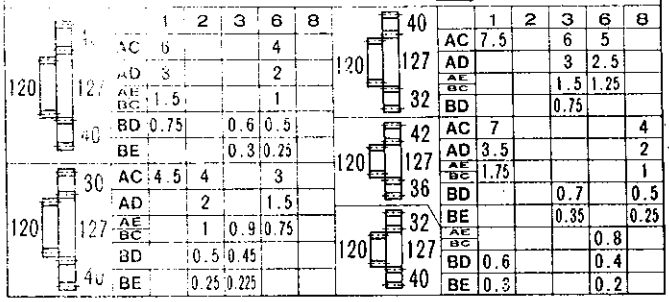
RANGE OF FEED (IN)

	1	2	3	4	5	6	7	8
AC	.0081	.0072	.0065	.0059	.0056	.0054	.0050	.0046
AD	.0040	.0036	.0032	.0029	.0028	.0027	.0025	.0023
AE/BC	.0020	.0018	.0016	.0015	.0014	.0014	.0012	.0012
BD	.0010	.0009	.0008	.0007	.0007	.0007	.0006	.0006
BE	.0005	.0005	.0004	.0004	.0004	.0003	.0003	.0003

FEEDS AND THREAD TABLE FOR METRIC SPECIFICATION

FOR CUTTING METRIC THREAD

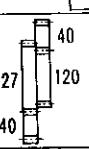
METRIC THREAD PITCH (mm)



	1	2	3	6	8
AC	6			4	
AD	3			2	
AE/BC	1.5			1	
BD	0.75		0.6	0.5	
BE			0.3	0.25	
AC	4.5	4		3	
AD		2		1.5	
AE/BC		1	0.9	0.75	
BD		0.5	0.45		
BE		0.25	0.225		
AC	7.5		6	5	
AD			3	2.5	
AE/BC			1.5	1.25	
BD			0.75		
AC	7				4
AD	3.5				2
AE/BC	1.75				1
BD			0.7		0.5
BE			0.35		0.25
AE/BC				0.8	
BD	0.6			0.4	
BE	0.3			0.2	

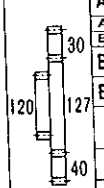
FOR CUTTING INCH THREAD

THREAD PER INCH (IN)



	1	2	3	4	5	6	7	8
AC	4	4½	5	5½	5¾	6	6½	7
AD	8	9	10	11	11½	12	13	14
AE/BC	16	18	20	22	23	24	26	28
BD	32	36	40	44	46	48	52	56
BE	64	72	80	88	92	96	104	112

RANGE OF FEED (mm)



	1	2	3	4	5	6	7	8
AC	1.188	1.056	0.950	0.864	0.826	0.792	0.731	0.679
AD	0.594	0.528	0.475	0.432	0.413	0.396	0.365	0.339
AE/BC	0.297	0.264	0.238	0.216	0.207	0.198	0.183	0.170
BD	0.148	0.132	0.119	0.108	0.103	0.099	0.091	0.085
BE	0.074	0.066	0.059	0.054	0.052	0.049	0.046	0.042

RANGE OF FEED (mm)

	1	2	3	4	5	6	7	8
AC	0.202	0.180	0.162	0.147	0.141	0.135	0.124	0.115
AD	0.101	0.090	0.081	0.074	0.070	0.067	0.062	0.058
AE/BC	0.051	0.045	0.040	0.037	0.035	0.034	0.031	0.029
BD	0.025	0.022	0.020	0.018	0.018	0.017	0.016	0.014
BE	0.013	0.011	0.010	0.009	0.009	0.008	0.008	0.007

5.10 THREAD INDICATOR

THE THREAD INDICATOR IS MOUNTED ON THE RIGHT HAND SIDE OF THE CARRIAGE AND IS ENGAGED WITH THE LEADSCREW. THE INDICATOR DIAL HAS 8 LINES, 4 OF WHICH ARE NUMBERED 1, 2, 3 AND 4. WHEN THE CARRIAGE IS STATIONARY AND THE LEAD SCREW IS REVOLVING, THE THREADING DIAL IS TURNING. A REFERENCE LINE IS IN THE HOUSING AND IS USED FOR REFERENCE ENGAGEMENT OF THE HALF NUT THERE IS AN INDICATOR TABLE IN THE THREADING CHART WHICH GIVES THE SELECTION OR SEQUENCE OF REVOLVING LINES WHICH CAN BE USED FOR A GIVEN INCH THREAD PITCH.

WHEN 1-4 IS INDICATED IT MEANS THAT THE HALF NUT CAN BE ENGAGED ON THE LINES ENGRAVED 1, 2, 3, OR 4.

WHEN 1-3 IS INDICATED, THE HALF NUT IS ENGAGED ON LINES ENGRAVED 1 AND 3.

THE SAME APPLIES WHEN THE INDICATOR CALL FOR 2-4.

THE INDICATOR CHART WILL ALSO REFER TO 1-8 WHICH MEANS THAT THE HALF NUT CAN BE ENGAGED ON ANY OF THE 8 LINES ON THE THREADING DIAL INDICATOR FOR SUCCESSIVE CUTS.

IMPORTANT

1. IF THE LATHE IS EQUIPPED WITH AN INCH LEAD SCREW, THE DIAL INDICATOR CAN ONLY BY USED FOR CUTTING INCH THREADS.

   WHEN CUTTING METRIC THREADS THE HALF NUT IS NEVER DISENGAGED. AT COMPLETION OF A THREADING CUT, THE CUTTING TOOL IS RETRACTED AND THE SPINDLE STOPPED. THE SPINDLE ROTATION IS REVERSED WHICH BRINGS THE CARRIAGE BACK TO THE BEGINNING POSITION. BY GOING BACK AND FORTH SUCCESSIVE CUTS ARE TAKEN TO THE REQUIRED THREAD DEPTH.

2. MAKE SURE THAT THE APPROPRIATE INDICATOR LINE ALWAYS COINCIDES WHICH THE FIXED LINE ON EACH CUT.

FOR INCH SPECIFICATION

THREAD INDICATOR METHOD	
AGREEMENT	A SORT OF INCH THREAD
ANYWHERE	8 16 24 32 40 48 56
	64 72 80 88 96 104 112
⊕	4 6 10 12 14 18 20 22
	26 28 36 44 46 52 92
⊕	5 7 9 11 13 23
○	4½ 5½ 6½ 11½
○	5¾

FOR METRIC SPECIFICATION

THREAD INDICATOR METHOD		
GEAR	AGREEMENT	A SORT OF METRIC THREAD
28T	ANYWHERE	0.2 0.25 0.3 0.5 0.6 0.75 1 1.5 3
	⊕	0.35 0.7 1.75 3.5 7
	○	? 6
24T	ANYWHERE	0.2 0.25 0.3 0.5 0.6 0.75 1 1.5 3
	⊕	0.225 0.45 0.9 4.5
	⊕	0.4 2 6
	○	0.8 4
20T	ANYWHERE	0.2 0.25 0.3 0.5 0.6 0.75 1 1.5 3
	⊕	1.25 2.5 5 7.5
	○	0.4 2 6

THREAD INDICATOR PLATE (FIG. 9)

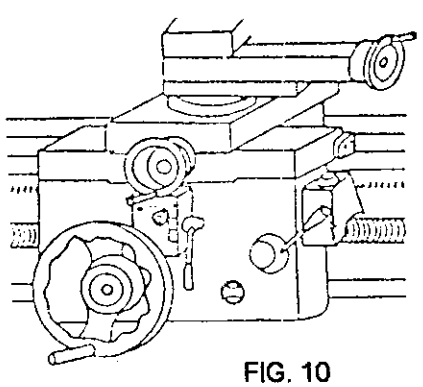


FIG. 10

5.11 AUTOMATIC FEEDING

(1). PUT THE POSITIVE-REVERSE SELECTIVE KNOB TO THE POSITION WHICH IS NEEDED.
(2). TURN THE TWO GEAR BOX SPEEDS CHANGE KNOB AND GEAR BOX SPEEDS SELECTIVE DISH.
(3). TURN THE FEEDS AND THREADS SELECTIVE KNOB TO THE LEFT, THE FEED ROD (5 IN FIG. 8) WILL TURN.
(4). PUSH DOWN THE AUTO-FEEDING SELECTOR (5 IN FIG. 11), THE MACHINE WILL HAVE A CROSS AUTOMATICALLY FEEDING. PULL THE LEVER (5 IN FIG. 11) UP, THE MACHINE WILL HAVE A LONGITUDINAL AUTOMATICALLY FEEDING.

IF YOU WANT TO FEED BY HAND, JUST PUT ALL THE LEVER BACK TO THE ORIGINAL POSITION, THE MACHINE IS NOW UNDER HAND WHEEL CONTROL TURN THE HAND WHEEL (4 IN FIG. 11) AND MACHINE CAN MAKE THE LONGITUDINAL FEEDING.

5.12 TOOL POST AND SADDLE

(1). MOVE SADDLE BY HANDLE WHEEL (9 IN FIG. 11).
(2). CROSS MOVEMENT OF THE TOOL POST IS ACCOMPLISHED BY TURNING THE HANDLE (3 IN FIG. 11). THE TOOL POST WILL MOVE TOWARDS THE CENTER WHEN TURNING THE HANDLE CLOCKWISE.
(3). BOTH THE CROSS-SLIDE AND COMPOUND SLIDE CAN BE LOCKED.

5.13 TAILSTOCK

THE ALIGNMENT OF THE TAILSTOCK WITH THE HEAD STOCK IS INSURED BY A "VEE" AND A "FLAT" IN THE MACHINE BED. ONCE POSITIONED IT IS LOCKED TO THE BED BY THE LEVER (2 IN FIG. 12) LOCATED AT THE BACK OF THE TAILSTOCK.

THE TAILSTOCK BODY (5 IN FIG. 12) MOUNTED ON A FIRM BASE (6 IN FIG. 12) AND MAY BE ADJUSTED BY MEANS OF AN ADJUSTING SCREW (7 IN FIG. 12) ON THE SIDE OF THE BODY FOR OFF-SETTING THE CENTER, CARRIED IN THE TAIL STOCK QUILL TO PERMIT TAPERS TO BE TURNED FOR LINING UP THIS CENTER WITH THAT IS IN THE HEAD STOCK SPINDLE. THE TAIL STOCK QUILL IS LOCKED BY MEANS OF A QUILL CLAMPING LEVER (1 IN FIG. 12).

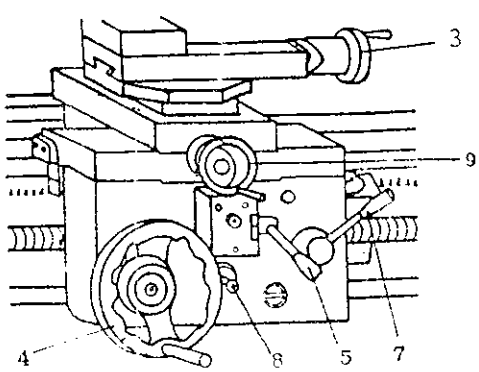


FIG. 11

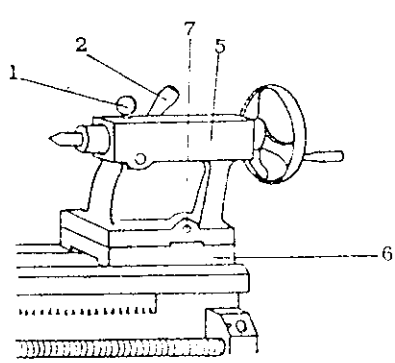


FIG. 12

5.14 COOLANT

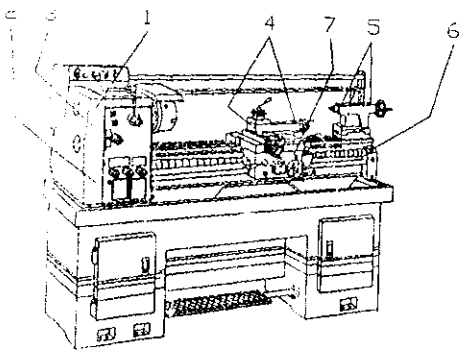
THE COOLANT PUMP IS FITTED TO THE COOLANT TANK AND IS OPERATED BY THE ON/OFF SWITCH LOCATDE ON THE ELECTRIC BOX CONTROL PANEL.

THE COOLANT TANK IS LOCATED AT THE BACK OF THE MACHINE AND HAS A CAPACITY OF 11.2 LITRES.

REGARDING CUTTING FLUID, WE SUGGEST THAT USING 76 U.S.A CALIFORNIA SOLUBLE OIL 10.

6 DAILY SERVICE

6.1 POSITION OF LUBRICATION AND FILLING DEVICES



LUBRICATION CHART (FIG. 13)

1. HEAD STOCK OILING INLET
2. GEAR BOX OILING INLET
3. CHANGE GEAR OILING INLET
4. SADDLE OILING INLET
5. TAILSTOCK OILING INLET
6. FEED ROD BRACKET OILING INLET
7. APRON OILING INLET

6.2 DAILY MAINTENANCE FOR OPERATORS

LUBRICATION

(1). ALWAYS KEEP IN MIND THAT THE ACCURACY AND LONG LIFE OF THE LATHE DEPENDS ON PROPER CARE AND LUBRICATION.

(2) BEFORE START-UP, MAKE SURE THAT THE FOLLOWING ARE PROPERLY LUBRICATED: HEAD STOCK, GEAR BOX, CROSS SLIDE, TOOL SLIDE, TOOL POST, SADDLE, APRON, TAIL STOCK, LEAD SCREW, FEED SHAFT AND SCREW BRACKET AND THE BEDWAYS.

NOTE: USE ONLY TOP QUALITY INDUSTRIAL LUBRICANTS.

ISO SPEC.	CONSISTENCY cst@ 40°C	MOBIL	ESSO	TOTAL	SHELL
VG-68	68	DTE HEAVY MEDIUM	TERESSO 68	AZLLA ZS 68	TURBO T68

a. HEAD STOCK LUBRICATION

FILL AND MAINTAIN OIL LEVEL AS INDICATED IN SIGHT GLASS. DRAIN AND CHANGE OIL TWICE YEARLY.

b. QUICK CHANGE BOX LUBRICATION

FILL AND MAINTAIN OIL LEVEL AS INDICATED IN SIGHT GLASS. DRAIN AND CHANGE OIL TWICE YEARLY.

c. CHANGE GEAR LUBRICATION - TWICE A MONTH

OPEN SIDE COVER OF HEAD STOCK AND FEED OIL ON THE GEARS DIRECTLY.

d. SLIDEWAYS

THE GUIDES OF SADDLE, CROSS SLIDE, COMPOUND SLIDE, TAIL STOCK AND BEDWAYS SHOULD RECEIVE A LIGHT FILM OF OIL.

MAKE SURE THAT THE COMPOUND SCREW AND NUT, CROSS FEED SCREW AND NUT AS WELL AS THE LEAD SCREW AND HALF NUT ARE PROPERLY LUBRICATED.

e. TAIL STOCK -- ONCE DAILY

OIL THROUGH OILIER FITTED ON TOP OF TAILSTOCK.

f. LEAD SCREW AND FEED ROD LUBRICATION -- AT LEAST ONCE OR TWICE DAILY

FEED OIL INTO THE LEAD SCREW DIRECTLY WITH OIL CAN. ALSO FEED OIL INTO LEAD SCREW BRACKET.

g. BEARINGS

ALL BALL AND ROLLER BEARINGS HAVE BEEN PROPERLY LUBRICATED AT THE FACTORY AND SPECIAL CARE MUST BE TAKEN NOT TO OVER GREASE AS IT WILL CAUSE OVERHEATING.

7 ADJUSTMENT

EACH ASSEMBLY WAS ADJUSTED AND SUBJECTED TO QUALITY AND ACCURACY TESTS PRIOR TO LEAVING THE FACTORY, HOWEVER RE-ADJUSTMENT MAY BE REQUIRED AFTER SOMETIMES AND THE FOLLOWING PROCEDURES SHOULD BE FOLLOWED.

7.1 LEVEL

THE LEVEL OF THE MACHINE IS A MAJOR FACTOR WHICH WILL INFLUENCE THE ACCURACY OF THE LATHE. SINCE THE FOUNDATION AND OTHER COMPONENTS WILL ALTER THE MACHINE LEVEL, REGULAR CHECK IS ESSENTIAL.

7.2 MAIN SPINDLE BEARING ADJUSTMENT

THE FRONT ROLLER BEARING IS A #30212 AND THE REAR ROLLER BEARING IS A #30210.

THESE BEARINGS HAVE BEEN PROPERLY ADJUSTED BEFORE LEAVING THE FACTORY. IF THEY BECOME LOOSE AFTER SOMETIMES, ADJUSTMENT CAN BE MADE BY FIRST RE- MOVING THE REAR BEARING CAP #CF-1105-01 AND RE TIGHTENING THE SPINDLE LOCK-NUT #CF-1110-01 SO TO HAVE THE MINIMUM RADIAL AND AXIAL PLAY. DO NOT ADJUST THE BEARINGS TOO TIGHT AS IT WILL CAUSE SPINDLE OVERHEATING AT HIGH SPEED.

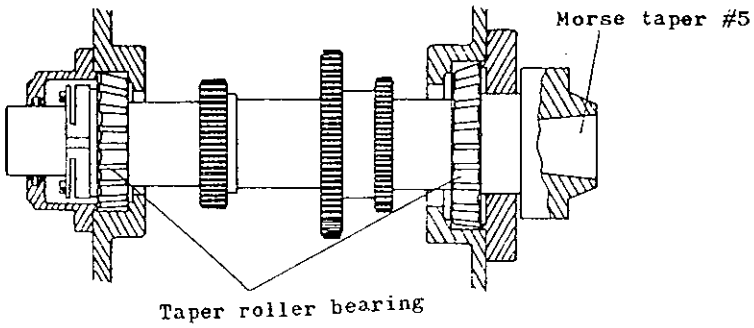


FIG. 14

7.3 ADJUSTMENT OF SADDLE AND CROSS-SLIDE FEED OVERLOAD

HERE IS A FEED OVERLOAD CLUTCH IN THE APRON WHICH IS ADJUSTED BY TURNING THE ADJUSTMENT SCREW (8 IN FIG. 11) CLOCKWISE IF THE SADDLE OR CROSS-SLIDE STOPS WHILE TAKING A CUT. CARE MUST BE TAKEN NOT TO OVER-TIGHTEN THIS SAFETY DEVICE AS YOU WILL NOT HAVE AN OVERLOAD PROTECTION.

7.4 ADJUSTMENT OF TAPER GIB

THERE IS A TAPER GIB ON THE CROSS SLIDE AND TOOL SLIDE RESPECTIVELY. ADJUST A TAPER GIB IN A SUCCESSIVE ORDER AS FOLLOWS:

ADJUSTMENT OF A CROSS SLIDE GIB: (FIG. 15)

a. LOOSEN AN ADJUSTING SCREW (2) AT THE READ AND TIGHTEN AND ADJUSTING SCREW (3) IN THE FRONT.
b. TURN CROSS SLIDE HANDLE AND MAKE SURE WHETHER A TAPER GIB HAS BEEN ADJUSTED. IF IT IS WELL ADJUSTED THEN TIGHTEN AN ADJUSTING SCREW.(3)

ADJUSTMENT OF A TOOL SLIDE GIB:

TIGHTEN AN ADJUSTING SCREW (1), AND THEN TURN THE HANDLE OF TOOL SLIDE TO MAKE SURE WHETHER A TAPER GIB HAS BEEN ADJUSTED.
ADJUSTMENT OF SADDLE GIB (FIG. 16)

SADDLE IS MOUNTED ON BEDWAY. IN ORDER TO KEEP LEVELING ACCURACY, THERE IS PLANE GIB TO BE ADJUSTED AS SHOWN IN FIGURE. IF THERE EXIST EXCESS CLEARANCE

BETWEEN SADDLE AND BEDWAY, LOOSEN THE FIXING NUT THEN FASTEN THE ADJUSTING BOLT IN RIGHT-HAND ROTATION. THE PLANE GIB WILL BE PUSHED TO PROPER POSITION AND THEN FASTEN THE FIXING NUT AGAIN.

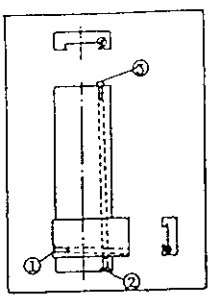


FIG. 15

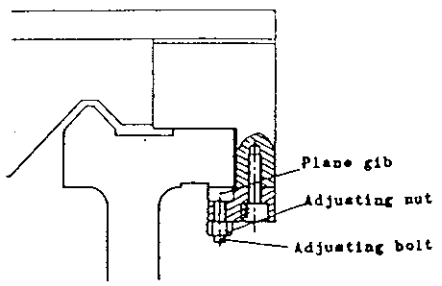


FIG. 16

7.5 CROSS SLIDE NUT

THE CROSS SLIDE NUT CAN BE ADJUSTED TO MINIMIZE THE BACK-LASH ON THE CROSS SLIDE SCREW. THIS ADJUSTMENT IS CARRIED OUT BY TIGHTENING THE CAP SCREW WHICH IS FITTED TO THE NUT AND WHICH CAN BE REACHED FROM THE REAR OF THE LATHE AFTER MOVING THE CROSS SLIDE TOWARDS THE BACK OF THE MACHINE.

7.6 ALIGNMENT OF THE TAILSTOCK

THE TAILSTOCK ASSEMBLY IS COMPRISED OF A BASE AND THE QUILL CASTING AND CAN BE ADJUSTED TO PERFECTLY LINE UP WITH THE HEADSTOCK SPINDLE AXIS OR CAN BE OFF-SET IN ORDER TO PRODUCE SHALLOW TAPERS.

7.7 TAILSTOCK LOCKING BOLT ADJUSTMENT

IF THE TAILSTOCK DOES NOT CLAMP POSITIVELY THE BED WHEN ACTUATING LEVER (2 IN FIG .12) READJUST THE CLAMPING BOLT NUT (FIG. 17)

7.8 BACKLASH ADJUSTMENT OF SADDLE LEADSCREW (FIG. 18)

THERE IS A FRICTION BETWEEN LEADSCREW AND SCREW NUT OF SADDLE AFTER LONG USE OF THE PARTS SO IT WILL BE WEAR PRODUCED. IN ORDER TO ELIMINATE THE EXCESS CLEARANCE, THE ADJUSTING BOLT SHOULD BE ADJUSTED. ITS ADJUSTING METHOD: AT FIRST, ROTATE THE LEADSCREW TO BACK END, FASTED THE ADJUSTING BOLT TO PROPER POSITION THAT THE CLEARANCE BETWEEN LEADSCREW AND LEADSCREW NUT IS ADEQUATE.

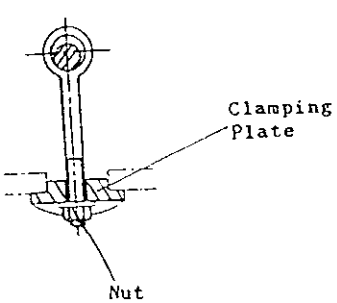


FIG. 17

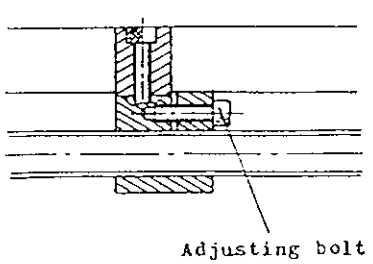


FIG. 18

7.9 SPARE PARTS

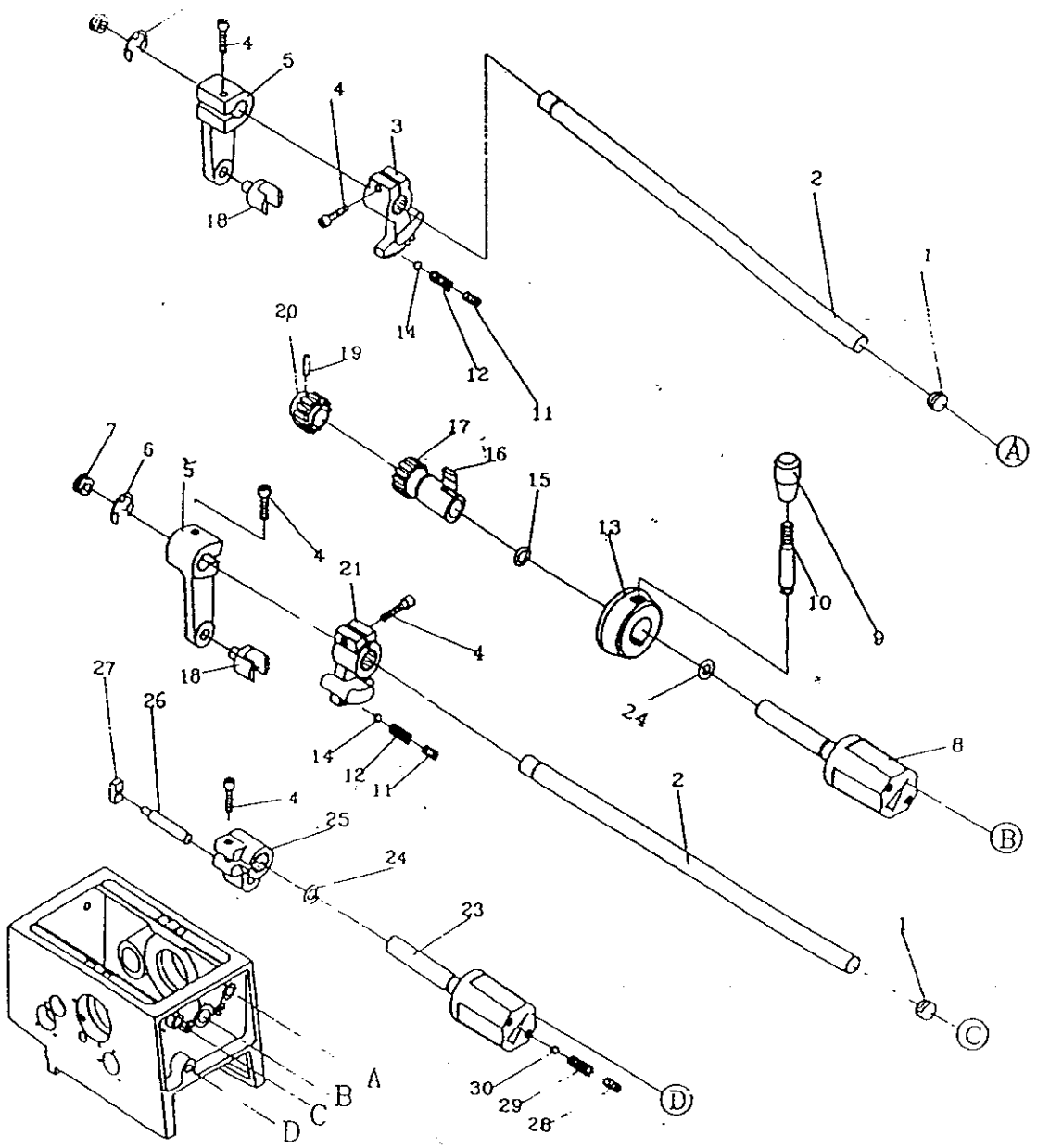
NO.	PARTS NUMBER	PARTS NAME
01	CF-6015-00	ALUMINUM TAPER PIN

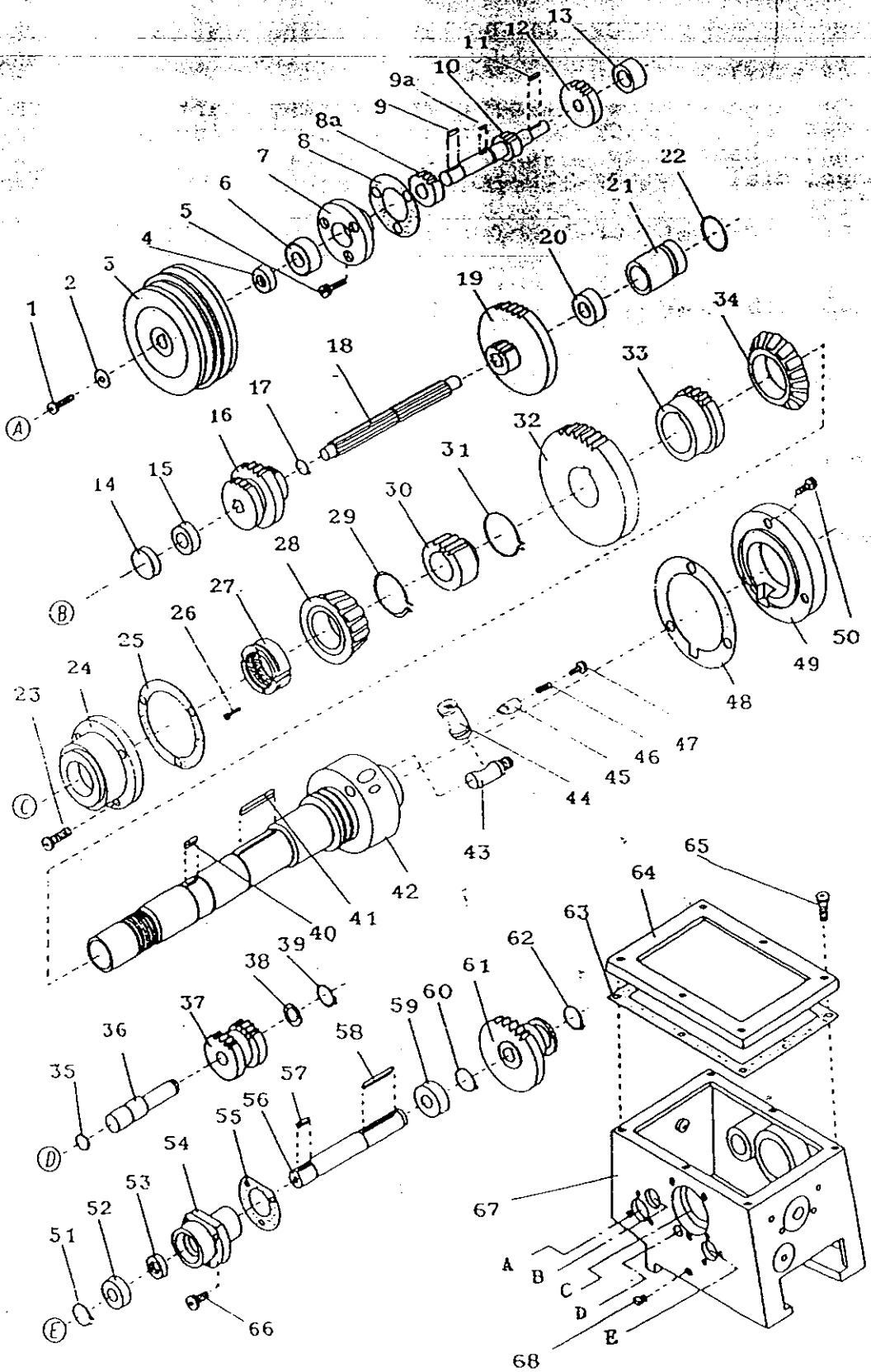
CONTENT

1. HEAD STOCK

1.1 GEARSHIFT

01. SEAL CAP	CF-6026-00	16. KEY	5X5X12
02. SHAFT	CF-1037-01	17. GEAR SHAFT	CF-1041-01
03. HALF GEAR	CF-1039-R2	18. SHAFT FORK	CF-1034-00
04. HEX. SOCKET HEAD SCREW	M6X30	19. SPRING PIN	ϕ 5X24
05. OPERATING LEVER	CF-1035-01	20. GEAR	CF-1044-00
06. RETAINING RING	E-12	21. HALF GEAR	CF-1039-L2
07. SEAL CAP	CF-6028-00	22. OPERATING LEVER	CF-1035-01
08. HANDLE KNOB	CF-1042-01	23. HANDLE KNOB	CF-1126-01
09. CYLINDRICAL HANDLE		24. O RING	P-12
10. CONTROL LEVER	CF-6047-00	25. OPERATING LEVER	CF-1128-01
11. SET SCREW	M10X10	26. SHAFT	CF-1130-00
12. SPRING		27. SLIDING BLOCK	EK-1129-00
13. HUB	CF-1046-00	28. SET SCREW	M8X10
14. STEEL BALL	ϕ 1/4"	29. SPRING	
15. O RING	P-22	30. STEEL BALL	ϕ 1/4"

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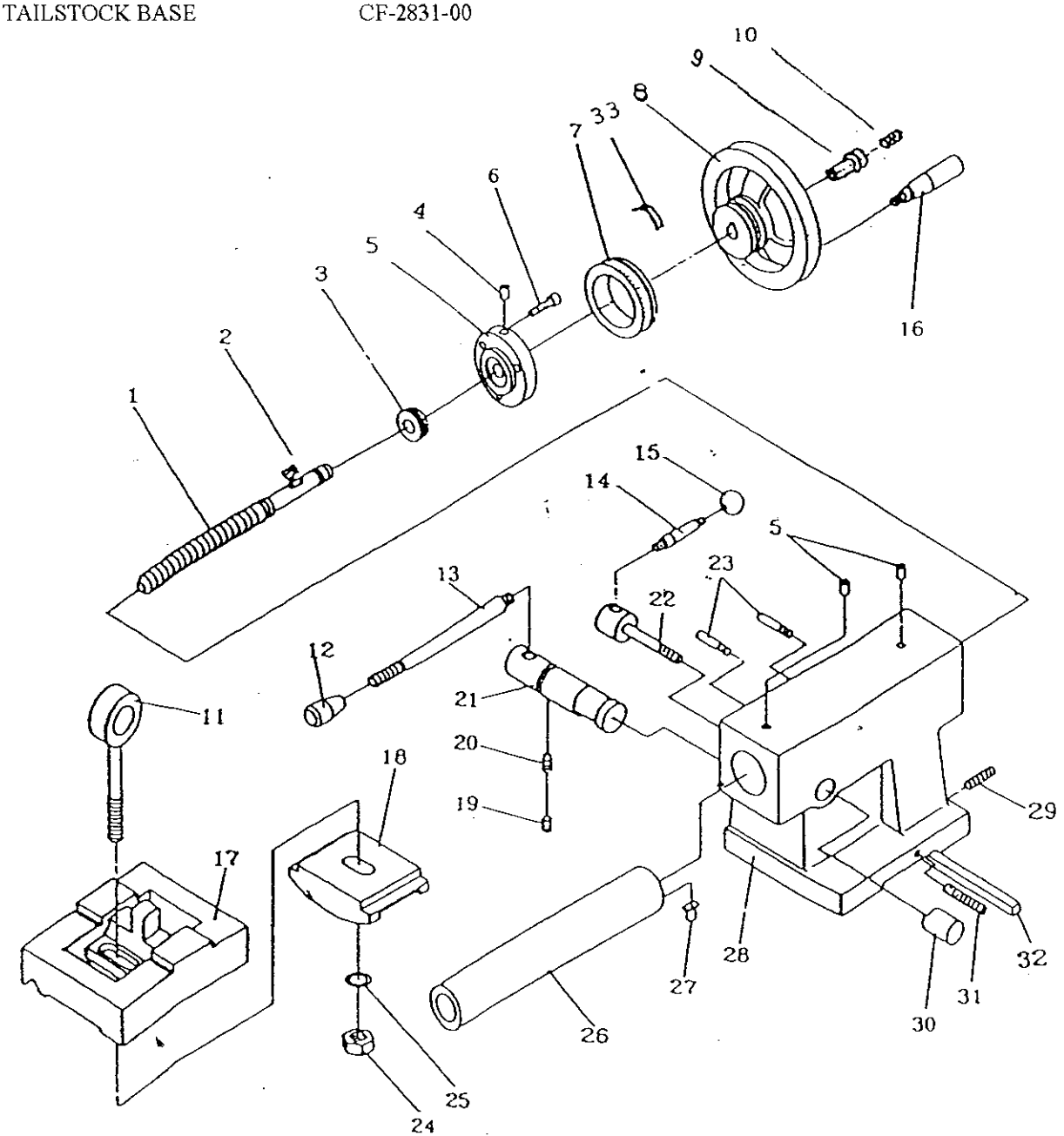
1.2 GEARING

01. HEX. SOCKET HEAD SCREW	M6X16
02. WASHER	CF-6068-00
03. V-BELT PULLEY	CF-1017-03
04. OIL SEAL	TC 20 35 8
05. HEX. SOCKET HEAD SCREW	M6X16
06. BALL BEARING	6204L
07. A SHAFT BEARING CAP	CF-1019-01
08. ASBESTOS PACKING	CF-1119-01
8a. GEAR	CF-1012-G3
09. KEY	CF-1214-01
9a. KEY	CF-1215-01
10. A SHAFT	CF-1013-G3
11. KEY	CF-1215-01
12. GEAR	CF-1032-G3
13. BALL BEARING	6203LL
14. B SHAFT BEARING CAP	CF-1063-00
15. BALL BEARING	6203L
16. GEAR	CF-1057-G1
17. RETAINING RING	S-22
18. B SHAFT	CF-1051-G0
19. GEAR	CF-1060-G0
20. BALL BEARING	6303L
21. B SHAFT BEARING CAP	CF-1062-01
22. O RING	P41
23. HEX. SOCKET HEAD SCREW	M6X16
24. REAR BEARING CAP	CF-1105-01
25. PACKING	CF-1106-00
26. HEX. SOCKET HEAD SCREW	M5X12
27. SPINDLE LOCK NUT	CF-1110-01
28. TAPER ROLLER BEARING	30210
29. RETAINING RING	S-50
30. GEAR	CF-1089-G0
31. RETAINING RING	S-55
32. GEAR	CF-1084-G0
33. GEAR	CF-1083-G0
34. TAPER ROLLER BEARING	30212
35. O RING	P-16
36. C SHAFT	CF-1111-00
37. GEAR	CF-1114-G0
38. WASHER	CF-1112-A0
39. RETAINING RING	S-26
40. KEY	5X5X22
41. KEY	8X8X62
42. SPINDLE	CF-1076-A1
43. CAMLOCK STUD	CF-7073-00
44. CAM	CF-1071-00
45. STOP BOLT FOR CAMS	CF-1072-00
46. SPRING	
47. HEX. SOCKET HEAD SCREW	M6X16
48. PACKING	CF-1177-00
49. FRONT BEARING CAP	CF-1077-01
50. HEX. SOCKET HEAD SCREW	M6X20
51. RETAINING RING	S-19
52. BALL BEARING	6004L
53. OIL SEAL	TC 20 35 8
54. BEARING CAP	CF-1122-00
55. PACKING	CF-1123-00
56. D SHAFT	CF-1118-00
57. KEY	CF-1218-00
58. KEY	CF-1275-00
59. BALL BEARING	6004L
60. RETAINING RING	S-20
61. GEAR	CF-1125-G0
62. RETAINING RING	S-20
63. PACKING	CF-1008-00
64. HEAD STOCK COVER	CF-1009-00
65. HEX. SOCKET HEAD SCREW	M6X25
66. HEX. SOCKET HEAD SCREW	M6X16
67. HEAD STOCK CASTING	CF-1801-00
68. GP SCREW	1/2"-UNC

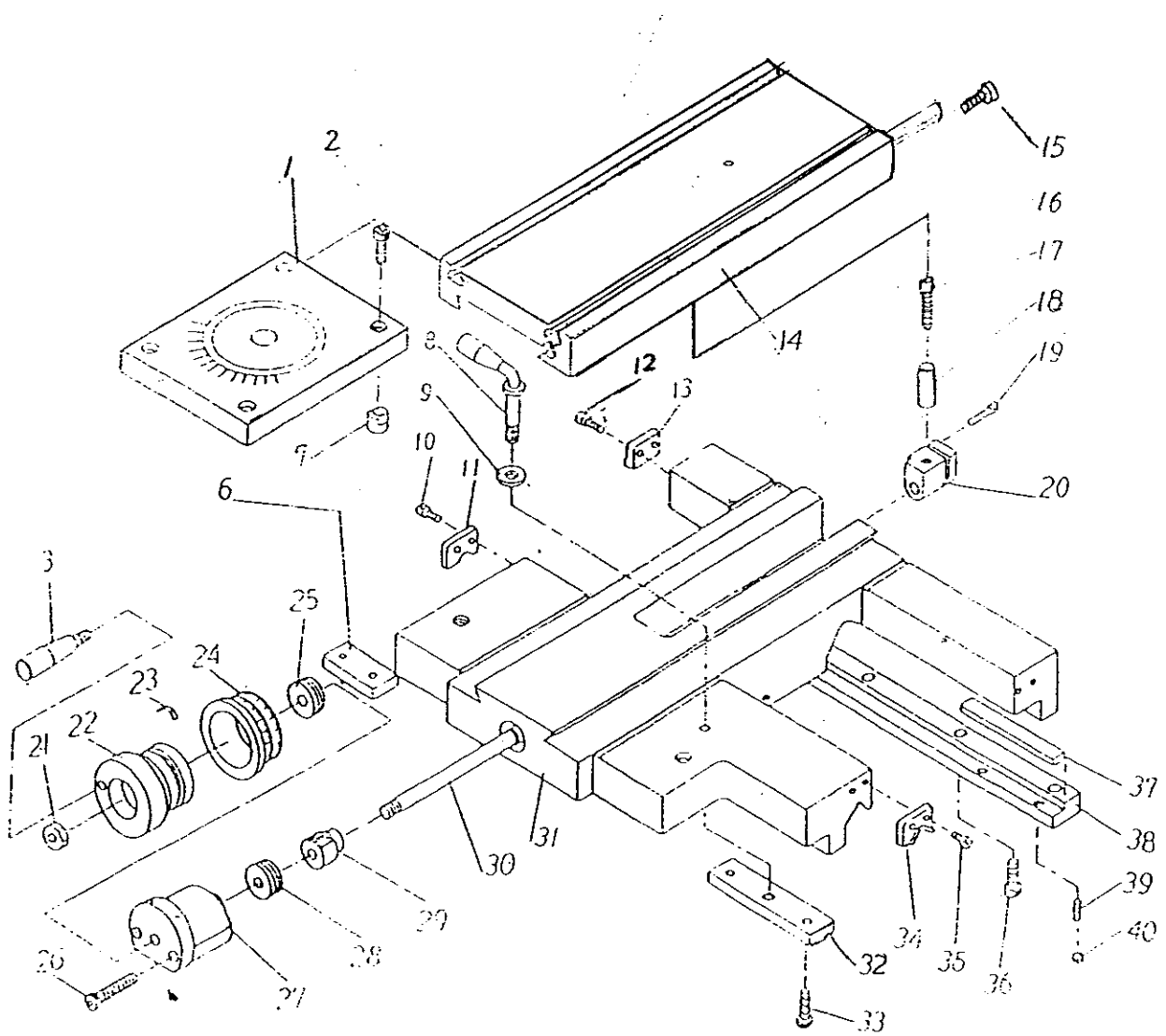
2. TAIL STOCK

01. FEED SCREW	CF-2008-00	18. CLAMPING PLATE	CF-2033-01
02. PIN	MB-7009-00	19. SET SCREW	M6X6
03. THRUST BALL BEARING	51101	20. SET SCREW	CF-2027-00
04. OIL BALL	ϕ 1/4"	21. SHAFT CLAMPING	CF-2028-00
05. SCREW HOLDER	CF-2011-00	22. SHAFT CLAMPING BOLT	CF-2021-00
06. HEX. SOCKET HEAD SCREW	M6X20	23. LEVER STUD	CF-2018-00
07. HANDLE WHEEL DIAL (M)	CF-2005-M0	24. NUT	ϕ 1/2"-12UNC
08. HANDLE WHEEL	CF-2004-00	25. WASHER	ϕ 1/2"
09. WASHER	CF-7020-00	26. TAILSTOCK QUILL	CF-2015-00
10. NUT	MB-7014-00	27. GUIDE PIN	CF-2017-00
11. CLAMPING BOLT	CF-2030-01	28. TAILSTOCK CASTINGS	CF-2001-00
12. CYLINDRICAL KNOB		29. SET SCREW	M6X25
13. HANDLE KNOB	CF-2026-00	30. CLAMP NUT	CF-2023-00
14. HANDLE KNOB	CF-2020-00	31. SET SCREW	M8X50
15. GRIP CLAMPING BALL		32. KEY	
16. HANDLE KNOB	CF-6044-00	33. FEED SPRING	CF-3035-00
17. TAILSTOCK BASE	CF-2831-00		



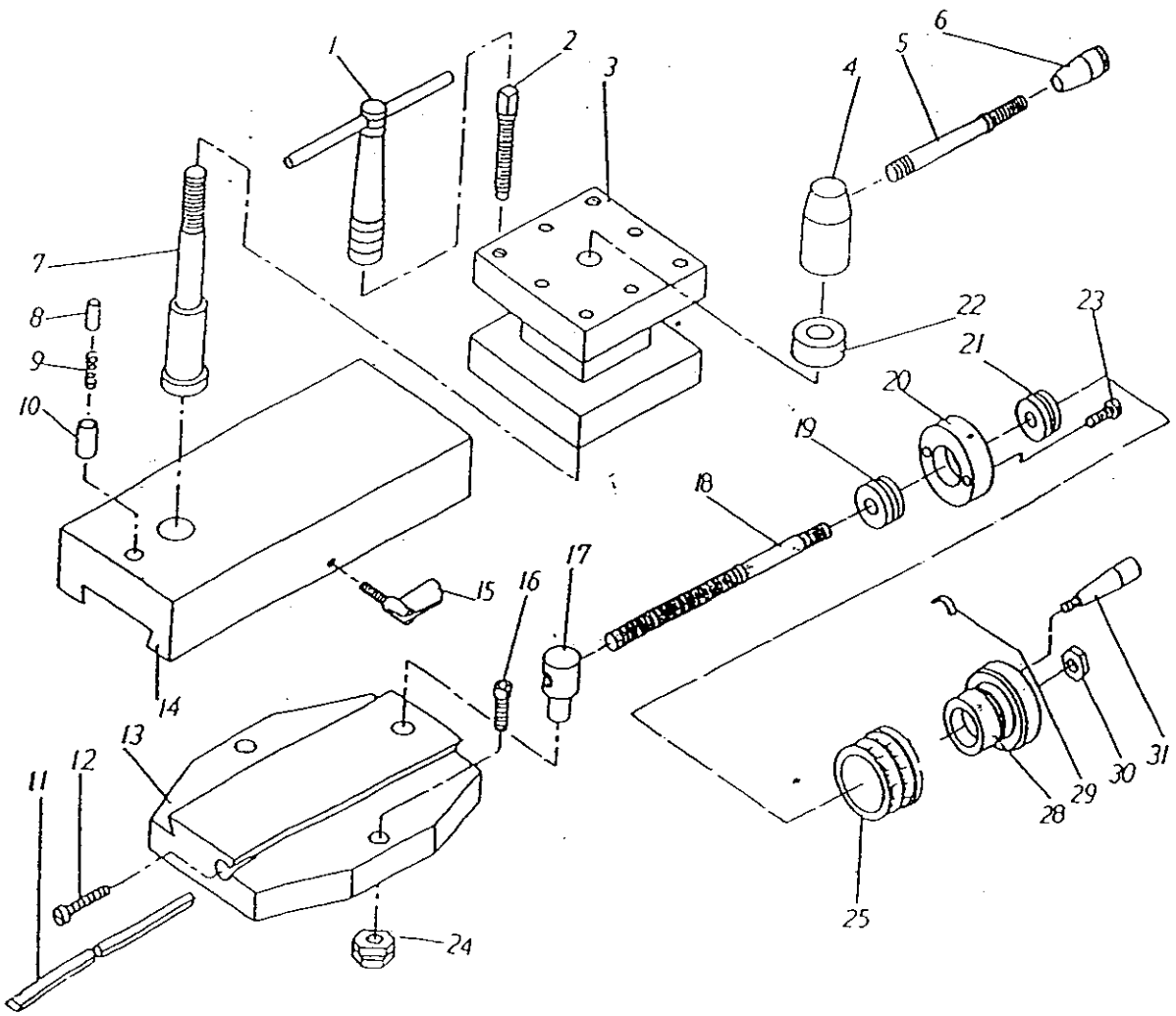
3. CARRIAGE

01. SWIVEL	DF-3138-00	22. HANDLE WHEEL	DF-3036-00
02. HEX. SOCKET HEAD SCREW	M8X20	23. FEED SPRING	CF-3035-00
03. HANDLE KNOB	CF-6044-00	24. CROSS FEED DIAL	DF-3032-M1
06. CLAMPING PLATE	CF-3012-00	25. THRUST BALL BEARING	51101
07. T SLOT NUT	CF-3039-00	(FOR DUAL DIAL)	
08. SADDLE LOCKING HANDLE	CF-3021-00	26. HEX. SOCKET HEAD SCREW	M6X50
09. WASHER	CF-3020-00	27. CROSS FEED SCREW BUSHING	DF-3029-00
10. ROUND HEAD SCREW	M6X10	28. THRUST BALL BEARING	51101
11. WIPER	CF-3007-00	29. GEAR	CF-3027-01
12. ROUND HEAD SCREW	M6X10	30. CROSS FEED SCREW (METRIC)	CF-2024-M1
13. WIPER	CF-3008-00	31. SADDLE	CF-3001-00
14. CROSS SLIDE	CF-3816-00	32. CLAMPING PLATE	CF-3112-01
15. GIB ADJUSTING SCREW	CF-3057-00	33. HEX. SOCKET HEAD SCREW	M6X16
16. TAPER GIB	DF-3017-00	34. WIPER	CF-3009-00
17. HEX. SOCKET HEAD SCREW	M6X20	35. CROSS FEED SCREW	M8X10
18. SCREW SET BUSHING	CF-3025-01	36. HEX. SOCKET HEAD SCREW	M8X20
19. HEX. SOCKET HEAD SCREW	M6X20	37. LOCK METAL PIECE	CF-3113-01
20. FEMAL SCREW NUT (METRIC)	CF-3023-M0	38. CLAMPING PLATE	DF-3013-00
21. NUT	M12	39. SET SCREW	M6X20
		40. NUT	M6



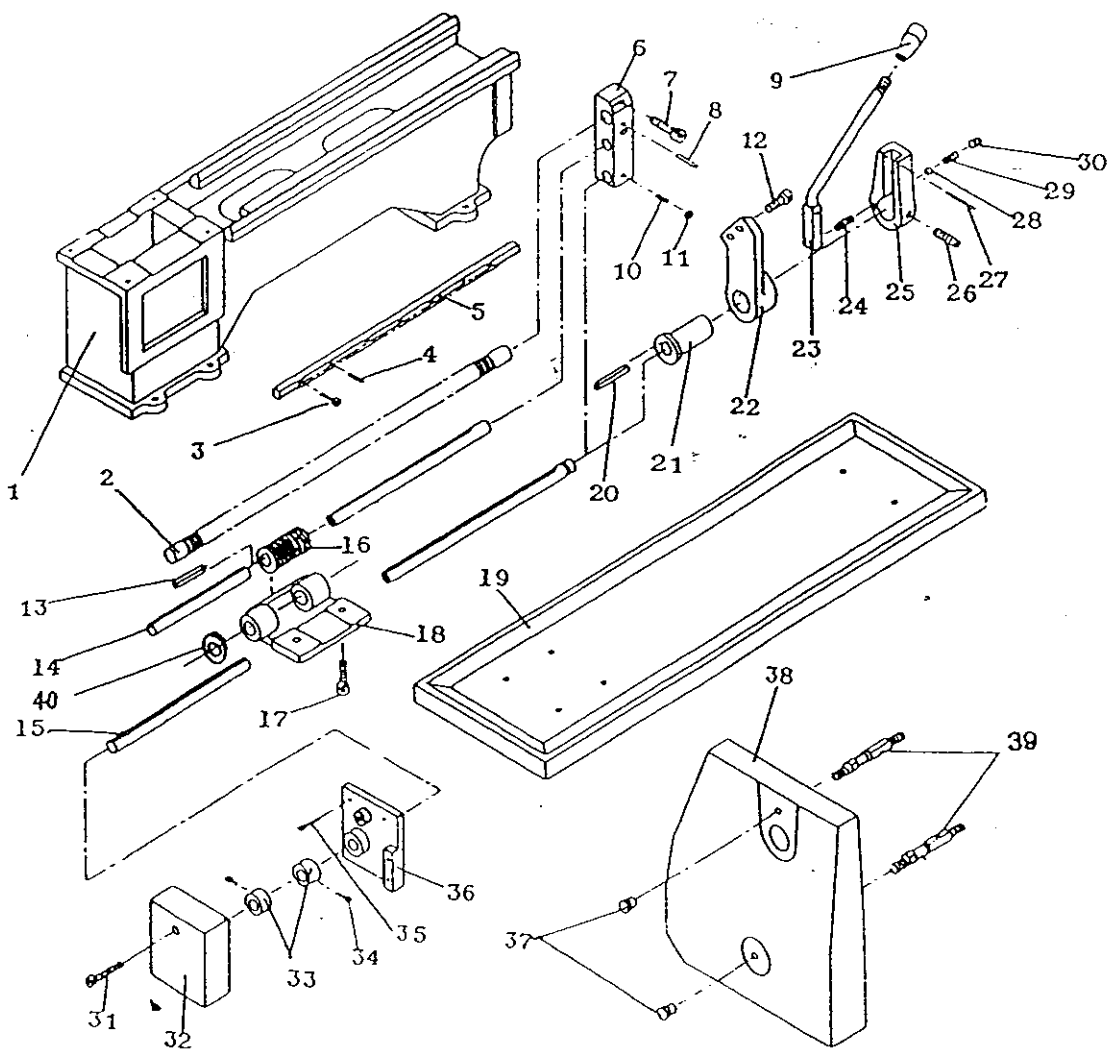
4. TOOL SLIDE

01. TOOL POST WRENCH	CF-3068-00	16. HEX. SOCKET HEAD SCREW	M8X20
02. SQUARE HEADED BOLT	DF-3064-00	17. COPPER SCREW NUT (M)	CF-3042-M0
03. 4 WAYS TOOL POST	DF-3063-00	18. COMPOUND SLIDE LEADSCREW (METRIC)	DF-3043-M0
04. TOOL POST LOCKING NUT	CF-3066-00		
05. HANDLE	CF-3067-00	19. THRUST BALL BEARING	51101
06. GRIP		20. COMPOUND SCREW BUSHING	DF-3046-00
07. SQUARE TURRET SHAFT	CF-3061-00	21. THRUST BALL BEARING	51101
08. BUSHING	DF-3060-00	22. SPRING	CF-3065-00
09. SPRING		23. HEX. SOCKET HEAD SCREW	M6X20
10. BUSHING	DF-3059-00	24. LOCK NET FOR SWIVEL	CF-3039-00
11. TAPER GIB	DF-3056-00	25. COMPOUND SLIDE DIAL	DF-3048-M0
12. GIB ADJUSTING SCREW	CF-3038-00	28. HANDKE WHEEL	DF-3052-00
13. SWIVEL	DF-3057-00	29. FEED SPRING	CF-3035-00
14. COMPOUND SLIDE	DF-3055-00	30. NUT	M12
15. LOCKING SCREW	CF-3058-00	31. HANDLE KNOB	DF-3053-00



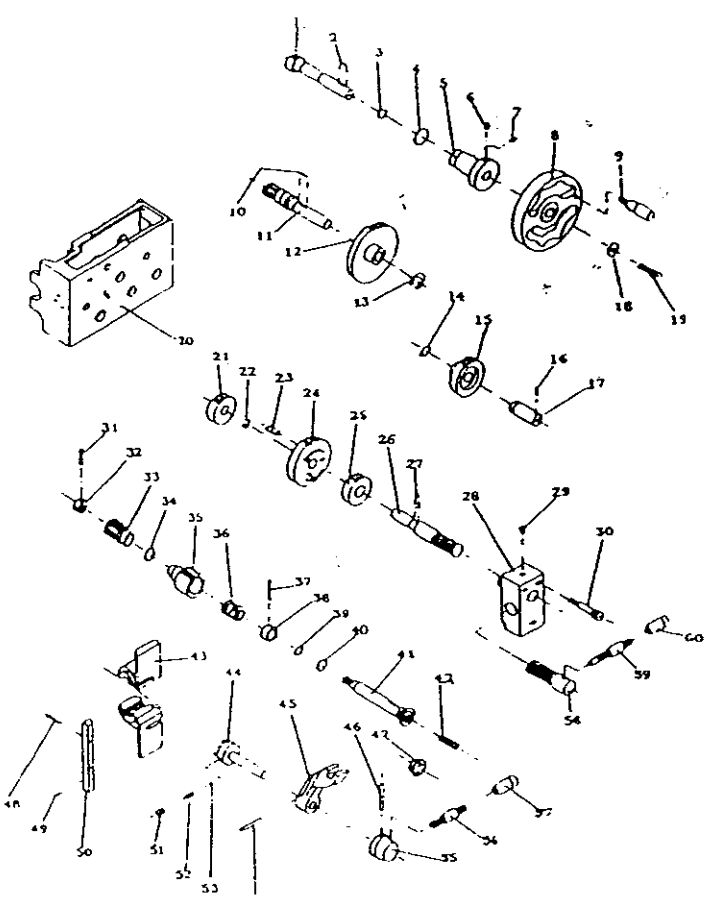
5. BED, LEADSCREW AND FEED ROD ASSEMBLY

01. BED	CF-6802-01	22. BRACKET	CF-6103-04
02. LEAD SCREW	CF-6816-M0	23. OPERATING HANDLE	CF-6106-01
03. HEX. SOCKET HEAD SCREW	M6X16	24. SPRING	
04. SPRING PIN	ϕ 5X24	25. BRACKET	CF-6105-02
05. RACK	DF-6707-R0	26. SOCKET SET SCREW	M8X8
06. BRACKET	CF-6010-30	27. SPRING PIN	ϕ 5X30
07. HEX. SOCKET HEAD SCREW	M8X35	28. STEEL BALL	ϕ 1/4"
08. SPRING PIN	ϕ 5X20	29. SPRING	
09. GRIP		30. SOCKET SET SCREW	M8X6
10. HEADLESS SCREW	M6X20	31. HEX. SOCKET HEAD SCREW	M6X45
11. FEMALE SCREW NUT	M6	32. LIMIT SWITCH COVER	CF-6109-01
12. HEX.. SOCKET HEAD SCREW	M6X16	33. SPACER	CF-6107-00
13. KEY	CF-6239-00	34. HEX. SOCKET HEAD SCREW	M6X10
14. FEED ROD	CF-6825-00	35. HEX. SOCKET HEAD SCREW	M6X12
15. FORWARD - REVERSE CONTROL LEVER	CF-6892-00	36. LOCKING BRACKET FOR FORWARD - REVERSE CONTROL LEVER	CF-6101-01
16. WORM	CF-6439-L0	37. PLASTIC LOCKING CLIP	
17. HEX. SOCKET HEAD SCREW	M8X30	38. SIDE COVER	CF-6880-D0
18. WORM CASTING	CF-6441-00	39. SIDE COVER LOCKING SCREW	CF-6081-00
19. CHIP TRAY	CF-6836-T0	40. WASHER	CF-6440-00
20. KEY	CF-6239-00		
21. BUSHING	CF-6104-02		

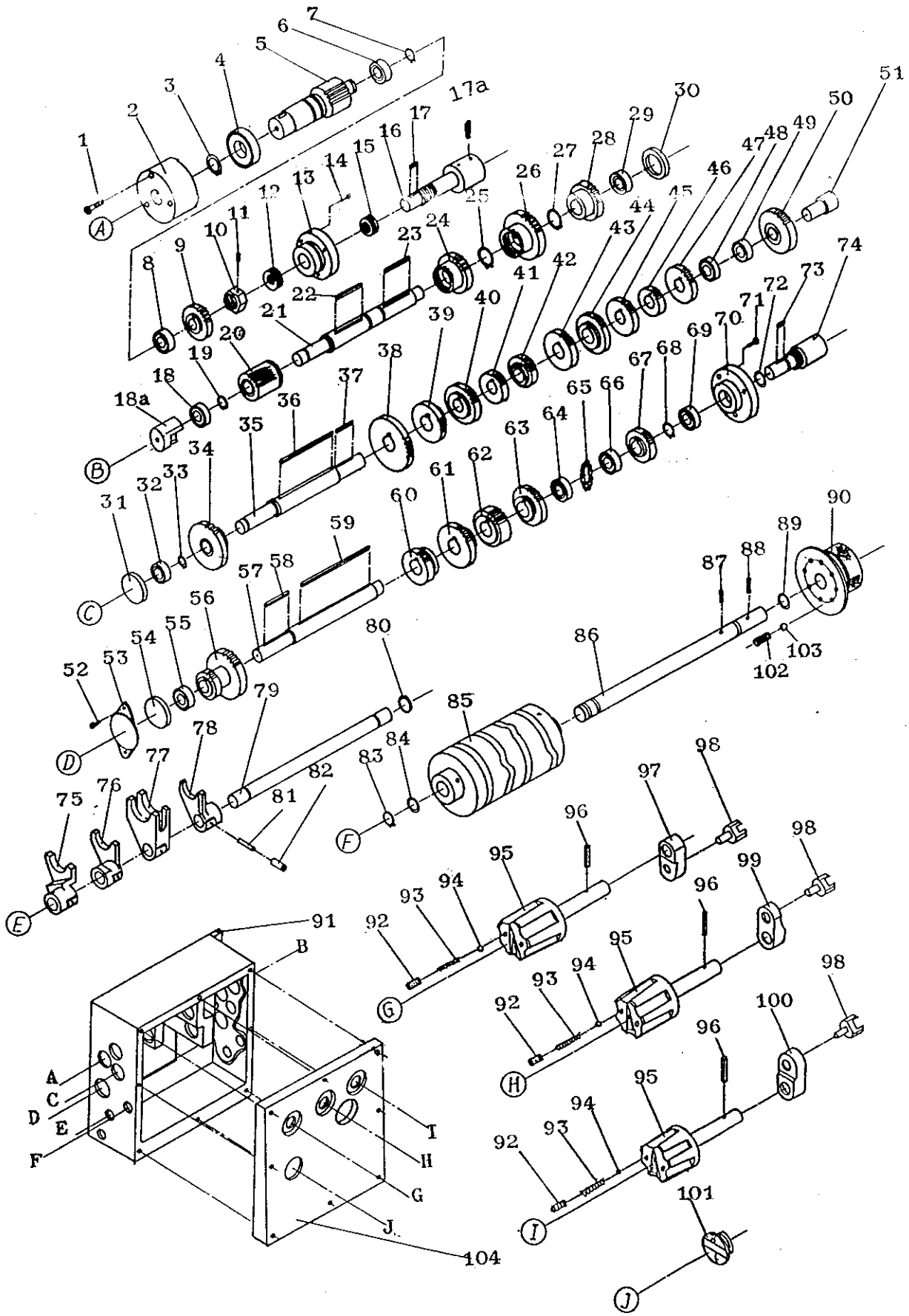


6. APRON

01. GEAR	CA-4010-00	31. SPRING PIN	ϕ 5X24
02. KEY	CF-1218-00	32. NUT	5/8"- UNF
03. O RING	P-12	33. WORM GEAR	CA-4037-L0
04. O RING	P-22	34. O RING	P-22
05. BUSHING	CA-4007-A0	35. GEAR	CA-4036-01
07. HEADLESS SCREW	M6X6	36. SPRING	CA-4035-00
08. HAND WHEEL	CA-4003-A0	37. PIN	ϕ 5X24
09. HANDLE	CF-6044-00	38. BUSHING	CA-4033-00
10. KEY	CF-1218-00	39. O RING	P-22
11. GEAR	CA-4013-00	40. O RING	P-22
12. GEAR	CA-4011-01	41. SHAFT	CA-4031-00
13. RETAINING RING	E-12	42. HEAKLESS SCREW	M8X20
14. RETAINING RING	S-16	43. HALF NUT BRACKET (METRIC)	CA-4442- M 0
15. GEAR	CA-4023-01	44. HALF NUT CLUTCH AXLE	CA-4049-00
16. HEADLESS SCREW	M6X6	45. SAFETY BRACKET	CA-4050-02
17. SHAFT	CA-4022-01	46. SPRING PIN	ϕ 5X40
18. WASHER	CF-6068-00	47. OIL GLASS	ϕ 29
19. HEX. SOCKET HEAD SCREW	M6X20	48. HEX. SOCKET HEAD SCREW	M6X20
20. APRON CASTING		49. HEADLESS SCREW	M6X8
(RIGHT HAND WHEEL)	CA-4001-R1	50. GIB FOR HALF NUT	CA-4046-00
21. GEAR	CA-4015-01	51. HEADLESS SCREW	M8X10
22. CIRCLET	E-12	52. SPRING	
23. AXLE	CA-4019-00	53. STEEL BALL	ϕ 5/16"
24. GEAR	CA-4017-01	54. SPRING PIN	ϕ 5X30
25. GEAR	CA-4020-01	55. HANDLE BOSS	CA-4045-00
26. GEAR SHAFT	CA-4016-00	56. HANDLE	CF-6047-00
27. KEY	DA-5212-00	57. GRIP	
28. BRACKET	CA-4021-01	58. GEAR SHAFT	CA-4028-00
29. OIL CAP	1/4"	59. CLUTCH HANDLE	CA-4029-00
30. HEX. SOCKET HEAD SCREW	M6X35	60. GRIP	



7 GEAR BOX

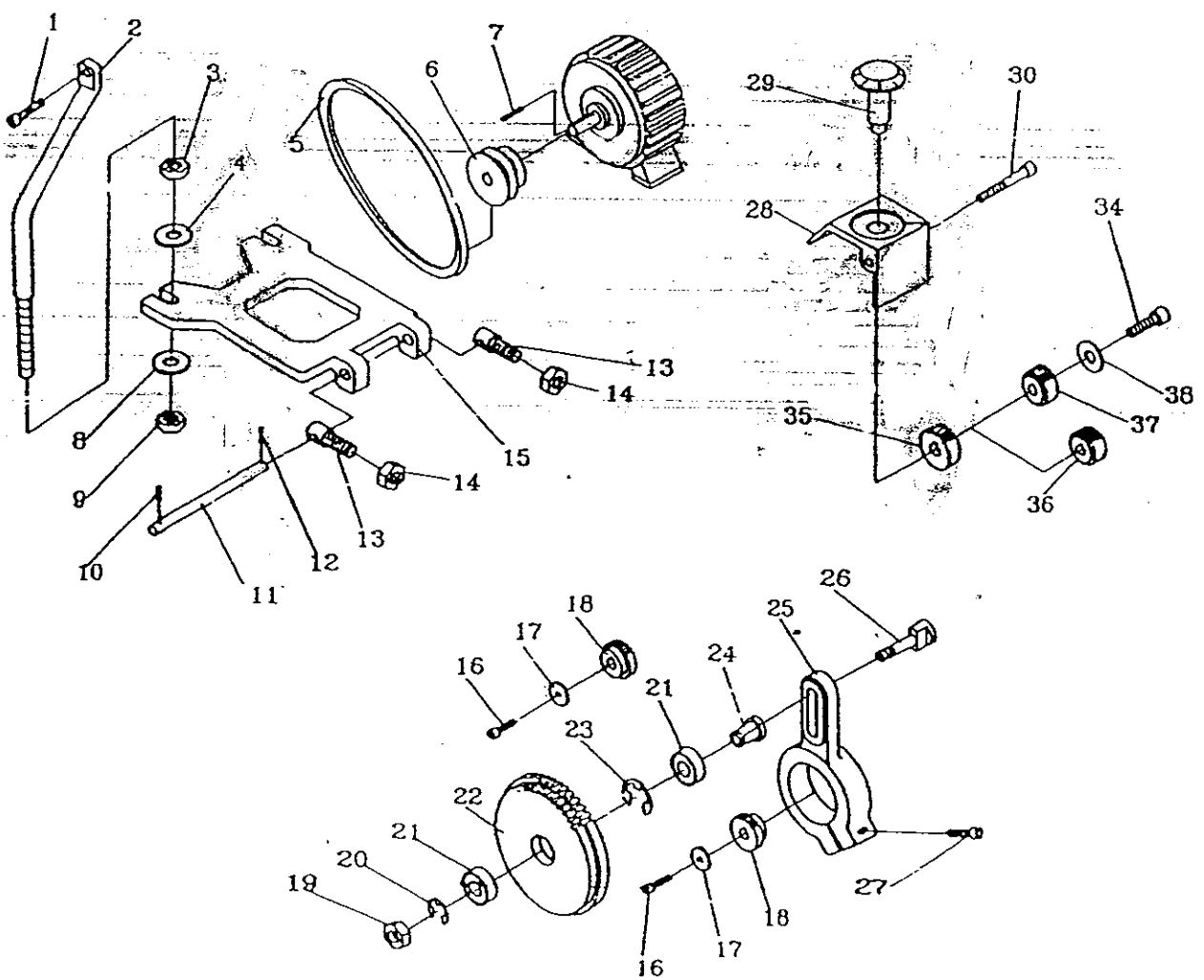


7. GEAR BOX

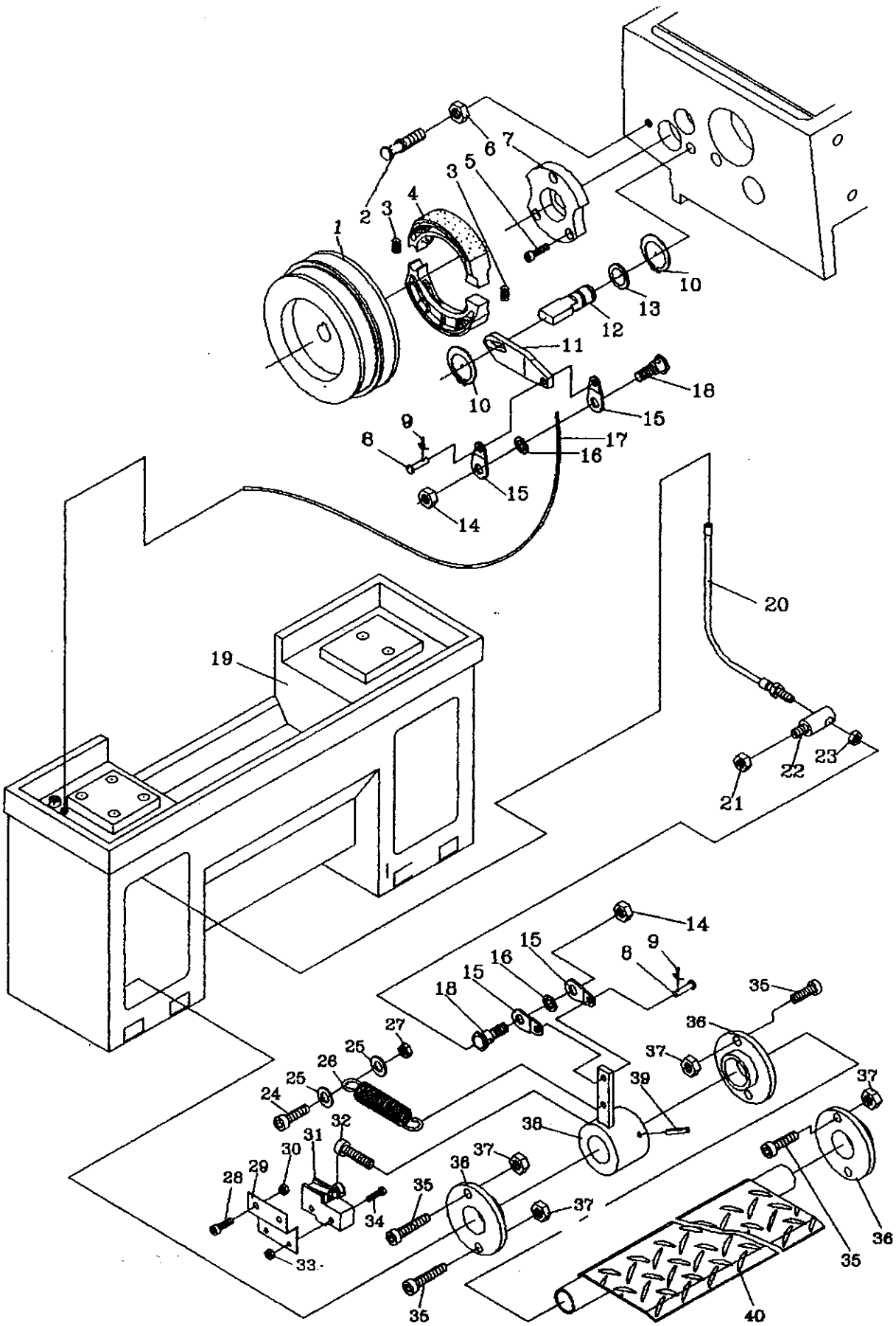
01. HEX. SOCKET HEAD SCREW	M6X25
02. BEARING CAP	DA-5010-00
03. RETAINING RING	S-20
04. BEARING	BR-6004-00
05. SHAFT	DA-5111-00
06. BEARING	BR-6202-00
07. RETAINING RING	S-15
08. BEARING	BR-6002-00
09. GEAR	DA-5113-00
10. ADJUSTING NUT	EK-5075-00
11. SET SCREW	M6X6
12. THRUST BALL BEARING	BR-5110-30
13. BEARING CAP	DA-5014-01
14. HEX. SOCKET HEAD SCREW	M6X16
15. THRUST BALL BEARING	BR-5110-30
16. SHAFT	DA-5112-00
17. KEY	DA-5212-00
17a.TAPER PIN	#4X32
18. BEARING	BR-6202-00
18a. BEARING CAP	DA-5025-00
19. RETAINING RING	S-16
20. GEAR 16T	DA-5121-00
21. SHAFT	DA-5120-00
22. KEY	DA-5220-00
23. KEY	DA-5220-00
24. GEAR 24T	DA-5122-00
25. RETAINING RING	S-17
26. GEAR 32T	DA-5123-00
27. RETAINING RING	S-17
28. GEAR 24T	DA-5124-00
29. BALL BEARING	BR-6202-00
30. BEARING CAP	CA-5021-00
31. BEARING CAP	CA-5021-00
32. BEARING	BR-6202-00
33. RETAINING RING	S-15
34. GEAR 30-15 T	DA-5131-00
35. SHAFT	DA-5130-00
36. KEY	DA-5231-00
37. KEY	DA-5230-00
38. GEAR 32T	DA-5132-00
39. GEAR 28T	DA-5133-00
40. GEAR 26T	DA-5134-00
41. GEAR 18T	DA-5135-00
42. GEAR 16T	DA-5136-00
43. GEAR 24T	DA-5137-00
44. GEAR 23T	DA-5138-00
45. GEAR 22T	DA-5139-00
46. GEAR 16T	DA-5140-00
47. GEAR 20T	DA-5141-00
48. BALL BEARING	BR-6002-00
49. BUSHING	DA-5142-01
50. GEAR 27T	DA-5143-00
51. SHAFT	DA-5144-01
52. ROUND HEAD SCREW	M6X10
53. BEARING CAP	EK-5038-00
54. BEARING CAP	CA-5021-00
55. BEARING	B6-6202-00
56. GEAR 15-30T	DA-5151-00
57. SHAFT	DA-5150-00
58. KEY	DA-5220-00
59. KEY	DA-5220-00
60. GEAR 24T	DA-5152-00
61. GEAR 24T	DA-5153-00
62. GEAR 24T	DA-5154-00
63. GEAR 24T	DA-5155-00
64. BALL BEARING	BR-6202-00
65. WAVE SPRING WASHER	DA-5156-00
66. BALL BEARING	BR-6202-00
67. GEAR	DA-5158-00
68. RETAINING RING	S-15
69. BEARING	BR-6202-00
70. BEARING CAP	DA-5059-01
71. HEX. SOCKET HEAD SCREW	M6X16
72. OIL SEAL	20X30X5
73. KEY	DA-5212-00
74. SHAFT	DA-5157-01
75. SHIFTER	DA-5261-00
76. SHIFTER	DA-5262-00
77. SHIFTER	DA-5263-00
78. SHIFTER	DA-5264-00
79. SHAFT	DA-5260-00
80. O RING	P-9
81. SHAFT	DA-5265-00
82. BUSHING	DA-5266-00
83. RETAINING RING	S-15
84. O RING	P-12
85. CAM	DA-5271-00
86. SHAFT	DA-5470-00
87. SPRING PIN	ϕ5X24
88. SPRING PIN	ϕ5X24
89. O RING	P-12
90. SELECTIVE DISC	DA-5472-00
91. GEAR BOX CASTING	DA-5001-00
92. HEADLESS SCREW	M6X6
93. SPRING	
94. STEEL BALL	ϕ1/4"
95. HANDLE KNOB	CA-5057-01
96. SPRING PIN	ϕ5X24
97. OPERATING LEVER	CA-5064-01
98. SHAFT FORK	CA-5066-00
99. OPERATING LEVER	CA-5064-01
100. OPERATING LEVER	CA-5064-01
101. OILL GLASS	
102. SPRING	
103. STECL BALL	ϕ1/4"
104. GEAR BOX COVER	DA-5402-01

8. MOTOR, THREAD INDICATOR AND CHANGE GEAR ASSEMBLY

01. HEX. SOCKET HEAD SCREW	M8X20	CHANGE GEAR 36T	CF-6072-00
02. MOTOR BASE LOCKING BOLT	CF-6046-01	CHANGE GEAR 42T	CF-6073-00
03. NUT	M12	19. NUT	M10
04. FLAT SPACER	1/2"	20. RETAINING RING	S-15
05. V BELT FOR 50Hz	B32	21. BALL BEARING	6003Z
06. MOTOR PULLEY FOR 50 Hz	DF-6055-H0	22. IDLE GEAR	CF-6065-00
07. KEY	6X6X30	23. CIRCLET	R-35
08. FLAT SPACER	1/2"	24. IDLE GEAR SHAFT	CF-6063-01
09. NUT	M12	25. IDLE GEAR HOLDER	CF-6058-00
10. SPRING PIN	4X20	26. BOLT	CF-6062-00
11. MOTOR BASE SHAFT	CF-6049-00	27. HEX. SOCKET HEAD SCREW	M8X45
12. OPENED PIN	1/8"X1"	28. THREAD INDICATOR BRACKET	CA-4062-00
13. SHAFT SCREW HOLDER	CF-6051-00	29. THREAD INDICATOR	CA-4064-00
14. NUT	5/8-UNF	30. HEX. SOCKET HEAD SCREW	M6X50
15. MOTOR BASE	CF-6042-00	34. HEX. SOCKET HEAD SCREW	M6X25
16. HEX. SOCKET HEAD SCREW	M6X16	35. GEAR 28T (METRIC)	CA-4065-M1
17. SPACER	CF-6068-00	36. GEAR 20T (METRIC)	CA-4065-M2
18. CHANGE GEAR 40T	CF-6070-00	37. GEAR 24T (METRIC)	CA-4065-M3
CHANGE GEAR 30T	CF-6069-00	38. WASHER	1/4"
CHANGE GEAR 32T	CF-6071-00		



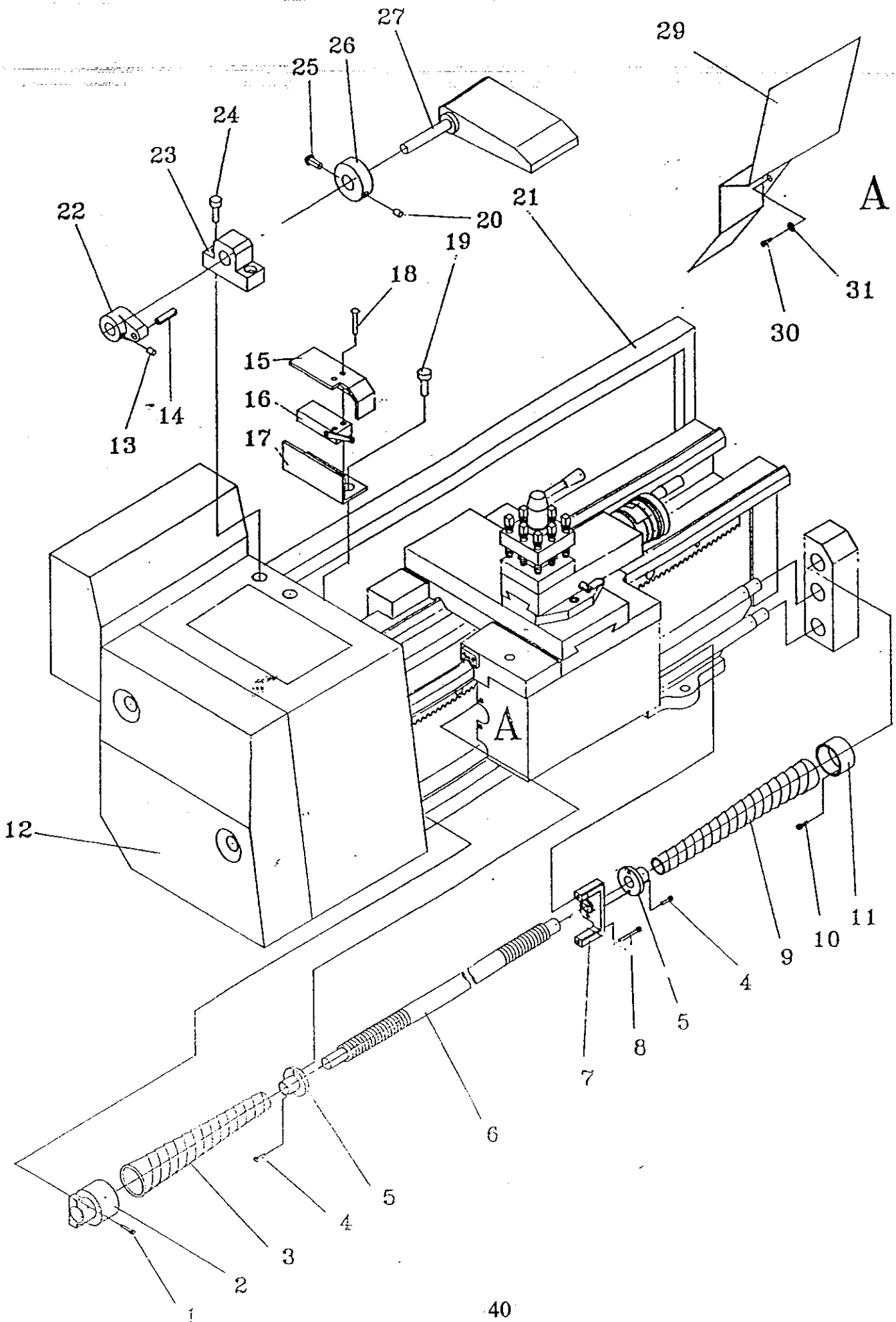
9. BRAKE ASSEMBLY



9. BRAKE ASSEMBLY

01. V BELT PULLEY	CF-1017-03
02. BRAKE SHOE LOCKING SCREW	CF-7040-00
03. SPRING	
04. BRAKE SHOE	
05. HEX. SOCKET HEAD SCREW	M6X16
06. NUT	M10
07. BEARING CAP	CF-1019-01
08. AXLE	
09. PIN	
10. RETAINING RING	S-17
11. BRAKE SHIFTER	CF-7042-00
12. BRAKE CAM	CF-7041-00
13. O RING	P-12
14. NUT	
15. BRAKE LINE	
16. SPRING WASHER	
17. BRAKE CABLE	
18. BRAKE CABLE LOCKING BOLT	
19. FLOOR STAND	CF-7832-00
20. BRAKE CABLE COVER	
21. NUT	M8
22. BRAKE LINE COVER LOCKING SCREW	CF-7044-00
23. NUT	M8
24. HEX. SOCKET HEAD SCREW	M8X20
25. WASHER	
26. SPRING	
27. NUT	M8
28. HEX. SOCKET HEAD SCREW	M6X12
29. LIMIT SWITCH BASE	CF-7047-00
30. NUT	M6
31. LIMIT SWITCH	
32. HEX. SOCKET HEAD SCREW	M6X20
33. NUT	M3
34. ROUND SCREW	M3X25
35. HEX. SOCKET HEAD SCREW	M6X20
36. BRACKET	CF-7046-00
37. NUT	M8
38. BRACKET SHIFTER	CF-7045-00
39. SPRING PIN	5X30
40. BRAKE PEDAL	CF-7848-00

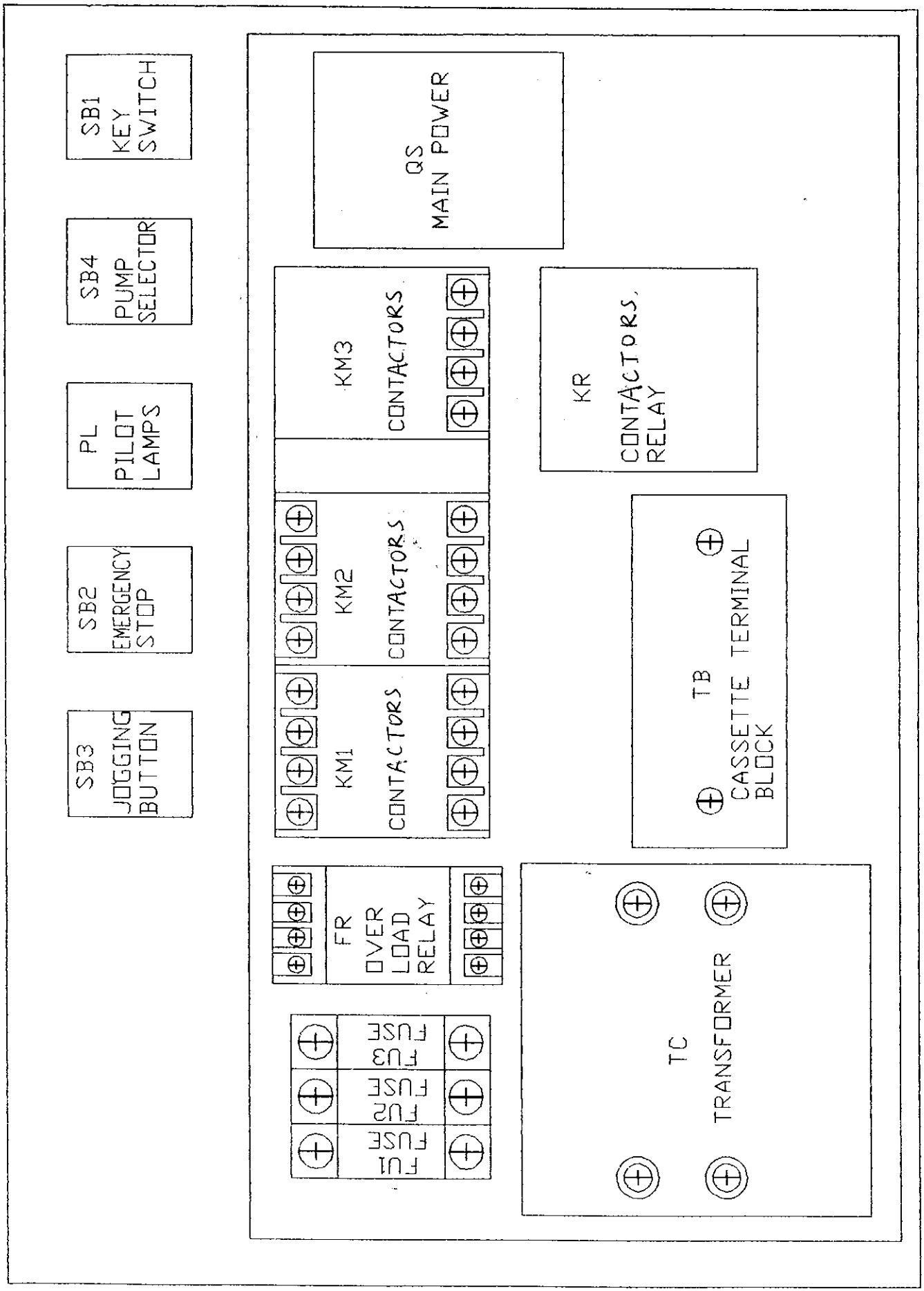
10. PROTECTION GUARD ASSEMBLY



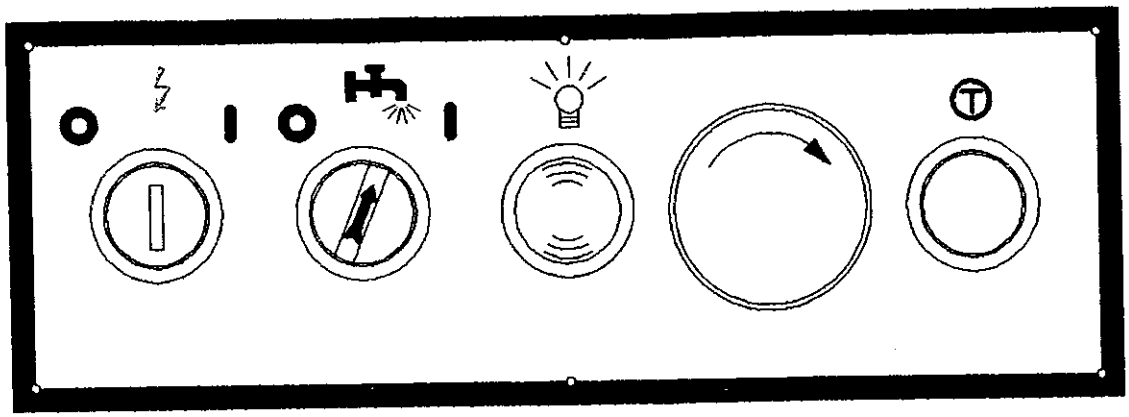
10. PROTECTION GUARD ASSEMBLY

01. HEX. SOCKET HEAD SCREW	M6X20
02. BUSHING	DF-7815-00
03. PROTECTION COVER (L)	
04. HEX. SOCKET HEAD SCREW	M6X16
05. BUSHING	DF-7816-00
06. LEAD SCREW (INCH FOR 17DF)	DF-6716-I0
LEAD SCREW (METRIC FOR 17DF)	DF-6716-M0
LEAD SCREW (INCH FOR 19DF)	DF-6916-I0
LEAD SCREW (METRIC FOR 19DF)	DF-6916-M0
07. BRACKET	DF-7417-00
08. HEX. SOCKET HEAD SCREW	M6X20
09. PROTECTION COVER (R)	
10. HEX. SOCKET SCREW	M6X20
11. BUSHING	DF-7818-00
12. SIDE COVER	DF-6080-D0
13. SET SCREW	M6X8
14. SPRING PIN	5X24
15. LIMIT SWITCH COVER	
16. LIMIT SWITCH	
17. LIMIT SWITCH BASE	
18. ROUND HEAD SCREW	M3X25
19. HEX. SOCKET HEAD SCREW	M6X16
20. SET SCREW	M6X8
21. SPLASH GUARD (FOR 17DF)	DF-7738-00
SPLASH GUARD (FOR 19DF)	DF-7938-00
22. LEVER	CF-7125-01
23. BRACKET	CF-7124-E0
24. HEX. SOCKET HEAD SCREW	M6X16
25. HEX. SOCKET HEAD SCREW	M6X16
26. SPACER	CF-6107-00
27. CHUCK GUARD	CF-7120-E0
29. CARRIAGE COVER	
30. HEX. SOCKET HEAD SCREW	M6X12
31. WASHER	

11. ELECTRICAL COMPONENTS AND LAYOUT

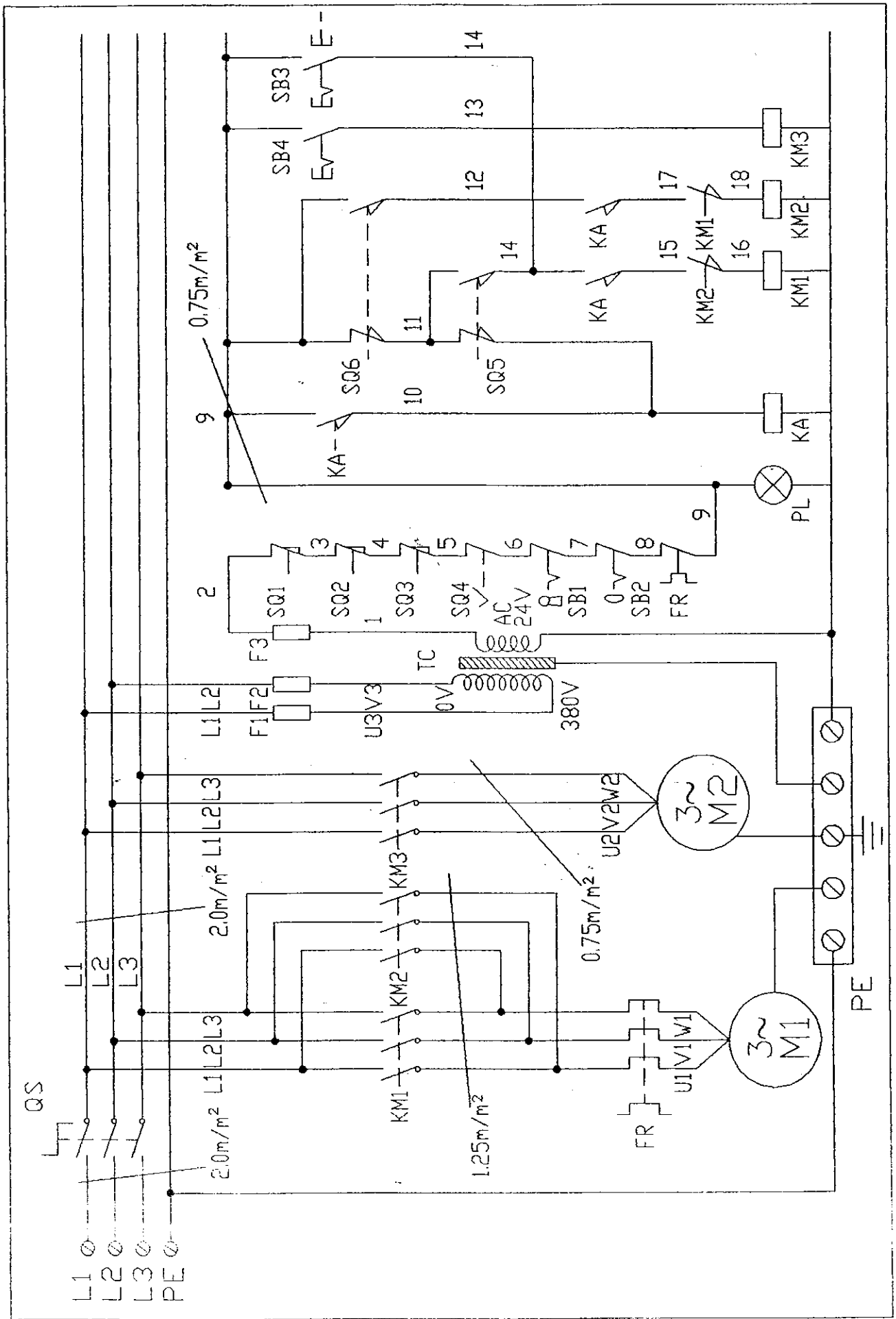


12 CONTROL PANEL, SWITCHES AND SYMBOLS



1. SWITCH
2. COOLANT PUMP SWITCH
3. PILOT LAMP
4. EMERGENCY STOP
5. JOGGING

13 POWER CIRCUIT



14 SCHEDULE OF ELECTRICAL EQUOPMENT

MANUFACTURER EXTRON	SCHEDULE OF ELECTRICAL EQUIPMENT				SHEET	
ORDER						
TYPE					DRAWN	
LATHE MACHINE (18DF - "CE")					CHECKED	
ITEM DESIGNATION	DESCRIPTION AND FUNCTION	TECHNICAL DATA	QTY.	SUPPLIER	SUPPLIERS REFERENCE	REMARKS
QS	MAIN POWER (DOOR LOCK) SWITCH	AC 500V/50Hz 3P 16A	1	BULLETIN	BULLETIN 1694Z	IEC 529 IP 55
FU1 FU2	AC FUSE TO TRANSFORMER	AC 600V 30 mm 2A	1	SHINING	FS-012	CSA.C22.2 NO.59.2
FU3	AC LOW VOLTAGE TO TRANSFORMER	AV 600V 30 mm 3A	1	SHINING	FS-011	CSA.C22.2 N0.59.2
KM1 KM2 KM3	CONTRACTORS	3PLA RI=AC 660V RT= 25A AC3 220V 2.2KW 380V 4.0KW	1 1 1	N.H.D HUH-DIAN	C-09D10 (4A)	IEC 292 VDE 0660 BS 5424-1 JIS 8325
FR	OVER-LOAD (RELAYS)	5 ~ 8A 6.5A UI=AC 600V ITH= 10A	1	N.H.D HUN-DIAN	BTH-12 (1NO+1NC)	IEC 292 VDE 0660 JIS 8325 BS 5424-1
KA	CONTRACTORS-RELAY	COIL=AC 24V AV 24V 5A DC 30V 5A	1	IDECIZUMI	RY4S-U	UL E55996 CSA LR25144
TC	TRANSFORMER	AC HI=380V(220V) LO=24V TR-72VA	1	SUENN- LIANG	SP-TBS	IEC 76-5 EN 60742 IEC IP-2
TB	CASSETTE TERMINAL-BLOCK	AC 600V MAX.15A	8	SHINING	TD-015H	UL E121562
PL	PILOT-LAMPS	AC 24V 1.5W 22	1	MACK	MK / L-22	IEC 144 IP 65
SB1 SB2 SB3 SB4	KEY-SWITCH EMERGENCY-STOP JOGGING-BUTTON PUMP-SELECTOR	AC 250V 10A MAX.600V 380V 7.5A 1NO+1NC 22	1 1 1 1	MACK MOELLER MACK MACK	MK / KS-22 MK / BF-22 MK / C-22	IEC 144 IP 65
SQ1	SAFE-COVER (LIMIT SWITCH)	AC 400V 15.2A 380V 7.5A 1NO + ANC 22	1	ORMON	D4D-1520N	IEC 947-5-1 EN 60947-5-1 EN 50047 IP 65
SQ2 SQ3 SQ4 SQ5	FOR-LIMIT.SWITCH-SQ5 REV-LIMIT SWITCH-SQ6 FOOT-CUT(L.S) BAD WAY-CUT(L.S) - SQ2	AC 125V 10A 250V 10A DC 115V 0.4A MAX.600V	1 1 1 1	MOUJEN	MJ - 1704	UL E100182 UL 66C7
CABLE-LOCK	CABLE - GLANDS		10	AVG	M - 16	IP 68
LINE	CONTROL - LINE	0.75 MAX.300V (30 / 0.18) - 7A AMBIENT TEMP (35℃ ~ 60℃)	1	TONG - WU		CNS 679 JIS C3307
CABLE	PVC CABLE - WIRE	2.0 ×4C(37 / 0.26)16A 1.25 ×4(50 / 0.18) /11A AMBIENT TEMP (35℃ ~ 60℃) MAX. 600V	1	TONG - WU		CNS 3301.4398 JIS C3342.3401
M1	MAIN - MOTOR		1			
M2	PUMP - MOTOR		1			