

OPERATOR'S HANDBOOK ZX-15 MILL



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NOTE

The information contained in this handbook is intended as a guide to the operation of these machines and does not form part of any contract. The data it contains has been obtained from the machine manufacturer and from other sources. Whilst every effort has been made to ensure the accuracy of these transcriptions it would be impracticable to verify each and every item. Furthermore, development of the machine may mean that the equipment supplied may differ in detail from the descriptions herein. The responsibility therefore lies with the user to satisfy himself that the equipment or process described is suitable for the purpose intended.

LIMITED WARRANTY

Warren Machine Tools Ltd. Makes every effort to assure that its products meet high quality and durability standards and warrants to the original retail consumer/purchaser of our products that each product be free from defects in materials and workmanship as follow: 1 YEAR LIMITED WARRANTY ON ALL PRODUCTS UNLESS SPECIFIED OTHERWISE. This Warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence or accidents, normal wear-and tear, repair or alterations outside our facilities, or to a lack of maintenance.

We shall in no event be liable for death, injuries to persons or property or for incidental, contingent, special, or consequential damages arising from the use of our products.

To take advantage of this warranty, the product or part must be returned to us for examination, postage prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection discloses a defect, we will either repair or replace the product, or refund the purchases price if we cannot readily and quickly provide a repair or replacement, if you are willing to accept a refund. We will return repaired product or replacement at WARCO'S expense, but if it is determined there in no defect, or that the defect resulted from causes not within the scope of WARCO'S warranty, then the user must bear the cost of storing and returning the product.

The manufacturers reserve the right to change specifications at any time as they continually strive to achieve better quality equipment.

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WARNING!

Read and understand the entire instruction manual before attempting set-up or operation of this mill/drill

- This machine is designed and intended for use by properly trained and experienced personnel only. If you are not familiar with the proper safe use of mill/drills, do not use this machine until proper Training and knowledge has been obtained.
- 2. **Keep guards in place.** Safety guards must be kept in place and in working order.
- Remover adjusting keys and wrenches. Before turning on machine, check to see that any adjusting wrenches are removed from the tool.
- Reduce the risk of unintentional starting.
 Make sure switch is in the OFF position before plugging in the tool.
- 5. **Do not force tools.** Always use a tool at the rate for which it was designed.
- Use the right tool. Do not force a tool or attachment do a job for which it was not designed.
- Maintain tools with care. Keep tools sharp and clean for best and safest performance. Follow instructions for lubrication and changing accessories.
- 8. Always disconnect the tools from the power Source before adjusting or servicing.
- Check for damaged parts. Check for alignment of moving parts, breakage of parts, mounting, and any Other condition that may affect the tools operation.
- Turn power off. Never leave a tool unattended.
 Do not leave a tool until it comes to a complete stop.
- 11. **Keep work area clean.** Cluttered areas and bench Invite accidents.
- Do not use in a dangerous environment. Do not Use power tools in damp or wet locations, or expose Them to rain. Keep work area well lighted.

- Keep children and visitors away. All visitors should be kept a safe distance from the work area
- 14 Make the workshop child proof. Use padlocks, . master switches and remove starter keys.
- 15. Wear proper apparel. Loose clothing, gloves, neckties, rings, bracelets, or other jewelry may get caught in moving parts. Non-slip footwear is recommended. Wear protective hair covering to contain long hair. Do not wear any glove.
- 16. Always use safety glasses. Also use face or dust mask if cutting operation is dusty. Everyday eyeglasses only have impact resistant lenses, they are not safety glasses. accessories may be hazardous.
- 17 **Do not overreach.** Keep proper footing and balance at all times.
- 18. **Do not place hands near the cutterhead** while the machine is operating.
- 19. Do not perform any set-up work while machine is operating.
- 20. Read and understand all warnings posted on the machine.
- 21 This manual is intended to familiarize you with the technical aspects of this mill/drill. It is not, nor was it intended to be, a training manual.
- 22. Failure to comply with all of theses warnings may result in serious injury.
- 23. Some dust created by power sanding, sawing, grinding, drilling and other construction activities contains chemicals known to cause cancer, birth defects or other reproductive harm.
- 24. Your risk from those exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals, work in a well ventilated are, and work with approved safety equipment

MAIN TECHNICAL SPECIFICATION

Specifications:	ZX-15	
Drilling Capacity	16mm	5/8"
End Mill Capacity	16mm	5/8"
Face Mill Capacity	63mm	2 1/2"
Swing	165mm	6 1/2"
Max. Distance Spindle to Table	400mm	16"
Spindle Taper	MT3	MT3
Spindle Stroke	80mm	3 1/8"
Quill Diameter	65mm	2 3/5"
Head Swivel Around Column	360°	360°
Head Tilt	±90°	±90°
Column Diameter	70mm	2 3/4"
Number of Spindle Speeds	4	4
Ranger of Spindle Speeds	400~1640 RF	PM
Working Surface of Table	150x630mm	6"X25"
Max. Table longitudinal Travel	350mm	13 3/4"
Max. Table Cross Travel	145mm	5 3/4"
Number of T-Slots	3	3
T-Slot Size	12mm	1/2"
Motor	3/4HP, 1Ph,	240V
Overall Dimensions	810 x 700 x 1	000mm
	32"X28"X44	25"
Net Weight(approx.)	. 130KGS	286LBS
Shipping Weight (approx.)	. 155KGS	342LBS

The specifications in this manual are given as general information and are not binding. Warco reserves the right to effect, at any time and without prior notice, changes or alterations to parts, fitting and accessory equipment deemed necessary for any reason whatsoever.

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↑ WARNING

Read and understand the entire contents of this Manual before attempting set-up or operation! Failure to comply may cause serious injure!

CONTENTS OF SHIPPING CONTAINER

- 1 Mill/Drill Machine
- 1 3/8" Drawbar
- 1 Spindle Cover
- 1 Test Flow Chat
- 1 Operator manual
- 1 Toolbox

Toolbox Contents (refer to Fig. 1)

- 1 1/2" Drill Chuck /Chuck Key
- 1 Crank Body
- 1 Crank Handle
- 2 Double End Spanner (12-14,17-19mm)
- 3 Hex Socket Wrench (3,4,5mm)
- 1 Flat Blade Screwdriver
- 1 MT3 Arbor
- 2 Handle

Fig. 1

Unpacking and Clean-up

- 1. Finish removing the wooden crate from around the mill/drill.
- 2. Unbolt the machine from the crate bottom.
- 3. Sling mill/drill with the proper tools through two holes on the base (A, B, Fig.2).
- Clean all rust protected surfaces using a mild commercial solvent, kerosene or diesel fuel. Do not use paint thinner, gasoline, or lacquer thinner. These will damage painted surfaces. Cover all cleaned surfaces with a light film of machine oil.

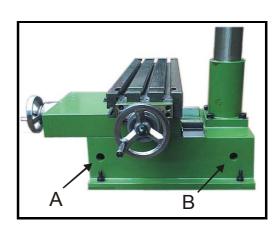


Fig.2

Assembly

- Screw rubber handles (A, Fig.3) onto handle shaft (B, Fig.3). Screw handle shaft into downfeed hub (C, Fig.1) and tighten. Flat spot on shaft accommodates a combination or adjustable wrench.
- 2. Repeat for other shaft assemblies.
- 3. Slide handwheel (D, Fig.4) onto table handwheel shaft and tighten set screw. Insert handle (E, Fig. 4) into handwheel and tighten.
- 4. Repeat for remaining table hand wheels.

Installation

↑ WARNING

Machine is heavy! Use an appropriate lifting device and use extreme caution when moving the machine to its final location.

Failure to comply may cause serious injury!

- 1. The location for the mill/drill should be well lit, dry, and have room enough to allow the head to rotate 360°.
- 2. Carefully lift the mill/drill with properly rated equipment to a sturdy stand or work bench. For best performance, through bolt the mill/drill to a bench or stand.
- 3. Before bolting the mill/drill to a bench or stand, the unit must be level in both directions. Place a level on the table in both directions.
- 4. If the table of the mill is not level, shim under the low corner(s) until level. Tighten the fastening bolts. Check for level again. Adjust as necessary until the mill/drill is level. Check again when securing bolts are tightened.

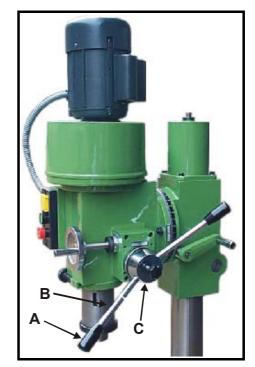


Fig. 3

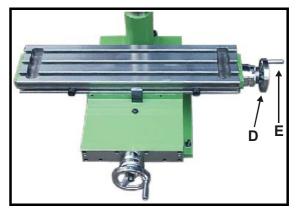


Fig. 4

Lubrication

Lubricate ball oilers (A, Fig.5) found by the X axis hand wheels, the ball oilers (B, Fig.5) found by the Y axis with Mobil DTE Oil Heavy Medium.

If the feed handles do not turn smoothly, apply Mobilith AW2 to the cross lead screw by removing the plug (C, Fig.5) on the front surface of the table, and longitudinal lead screw from underside of the longitudinal table.

Lubricate the ball oilers (D, Fig.5 & Fig.6) for X way and the ball oilers (F, Fig.6) for Y way once daily with Mobil DTE Oil Heavy Medium.

Lubricate the ball oilers (E, Fig.5) found on the front of spindle sleeve once daily with Mobil DTE Oil Heavy Medium.

If the head can not raise, or lower smoothly apply Moilith AW2 to the hole (G, Fig.7) on the backside of the head, and Mobil DTE Oil Heavy Medium to the Column.

Electrical Connections

★ WARNING

A qualified electrician must make all electrical connections.

Failure to comply may cause serious injury!

Before making any electrical connections, make sure the power source available is compatible with the machine. Also, press the "Off" button on the front of the machine before connecting to the power source.

The ZX-15 is rate at 240V/50Hz/1Ph.

Make sure the mill/drill is properly earthed.

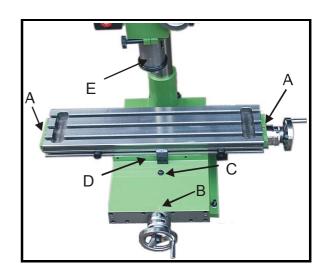


Fig. 5

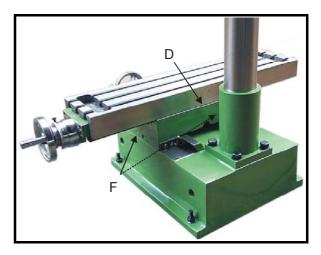


Fig.6



Fig.7

Controls

Longitudinal Hand Wheel: (X-axis)(A, Fig.8)

Located on right side of the table. Moves table side to side.

Cross Feed Hand Wheel: (Y-axis)(B, Fig.8)

Located on the front of the base. Moves table toward, or away from the column.

Adjustable Table Stops: (C, Fig.8)

Located on table front. Adjust to stop table at any setting along the longitudinal axis.

Table Locks: (D&E, Fig.8)

Longitudinal table locks are located on front of the table. Cross-feed table locks are located on the right side under the table. Turn clockwise with hex socket wrench to lock.

Down feed Handles: (F, Fig.9):

Located on the right side of the head casting. Counter-Clockwise movement advances the quill toward the table. Return spring retracts the handles. To engage fine feed press lever to relieve tension, press in knob (H, Fig.9), fine feed's holl engaged to disengage reverse procedure.

Fine Feed Hand Wheel:(G, Fig.9)

Located on the front of the head casting. Clockwise turn the hand wheel to down feed the spindle, reverse to retract it.

Down feed Stop: (J, Fig.9)

Located on the right side of down feed handle base. Lock the screw to the desired position for the guill depth stop.

Quill Lock Knob: (K, Fig.9)

Located on the front left of the head casting. Turn clockwise to lock the quill in the desired position. Turn counter-clockwise to release.

On-off Switch: (L, Fig.9)

Located on the front the head casting. Turns power on and off to the mill/drill.

Motor Mount Adjust Lever: (M, Fig.10)

Located on the left rear of the belt cover. Loosen the two hexagon nuts (O, Fig.10) and move the lever clockwise to loosen the belt. Move the lever counter-clockwise to tighten the belt.

Head Pivot Lock Lever: (N, Fig.10)

Located on the left rear of head casting. Turn

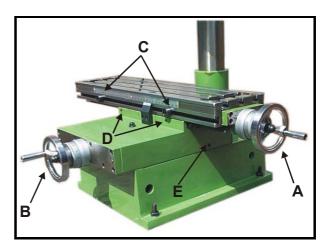


Fig.8



Fig.9

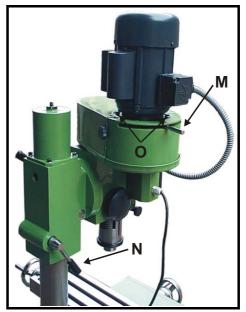


Fig. 10

counter-clockwise to rotate the head 360°. Turn clockwise to lock the head in position.

Head Tilt Crank Handle: (A, Fig.11)

The crank handle is in the tool box. Engage the handle on the shaft located on the right rear of head casting. Loosen the nut (B, Fig.11) before tilting the head. Turn the handle to tilt the head to the desired position. Tighten the nut.

Head Elevating Crank Handle: (C, Fig.11)

The same handle as the head tilt crank handle that in the tool box. Engage the handle on the shaft located on the top of the column. Loosen head pivot lock lever (N, Fig.10) and turn handle clockwise to down head on the column and counter-clockwise to up head.

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Failure to comply may cause serious injury!

Changing Spindle Speeds

- 1. Disconnect the machine from the power source, unplug.
- 2. Loose the knobs on the both side of the cover (D, Fig, 12 & G, Fig.13) and remover the cover.
- 3. Loose two hexagon nuts (E, Fig.12&H, Fig.13), move the motor adjust lever (F, Fig.12) counter-clockwise to loose the belt.
- 4. Arrange the v-belts one the pulley for the desired speed according to the speed chart (I, Fig.13) on the front of the head casting.
- 5. Tension the V-belt by move the motor adjust lever (F, Fig.12) clockwise properly and tighten two hexagon nuts. Recover the belt and tighten the knobs.

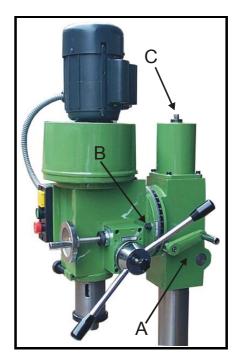


Fig.11

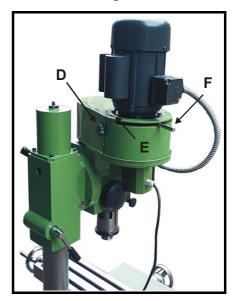


Fig.12



Fig.13

Arbor Replacement

- 1. Disconnect machine from the power source, unplug.
- 2. Loose the knobs on the both side of the cover (D, Fig, 12 & G, Fig.13) and remover the cover
- 3. Hold the spindle pulley(A, Fig.14) to keep the pulley from moving while loosening the drawbar (B, Fig 14) with a wrench.
- 4. Loosen the drawbar approximately three to four full turns.
- 5. Tap the drawbar head with a rubber mallet to dislodge the arbor.
- Grasp the arbor with on hand while loosening the draw bar with the other. Continue to loosen the drawbar until the arbor can be withdrawn from the spindle. Wipe out the spindle with a clean dry rag.
- 7. Wipe down the new arbor with a clean dry rag and place the arbor into the spindle. Thread the drawbar into the arbor. Tighten the drawbar with a wrench while holding on to the spindle pulley.

↑ WARNING

Use caution when tightening drawbar! Do not allow hand to get pinched between pulley and belt!

Failure to comply may cause serious injury!

Gibs Adjustment

After a period of time, movement of the table over the ways will cause normal wear. Adjust the gibs to compensate for this wear.

- The horizontal gib adjustment screw (A, Fig.15) is found to the rear right on table. The traverse gib adjustment screw (B, Fig.16) is found on the right side of saddle under the table.
- 2. Turn each screw slightly clockwise to tighten. Turn the table hand wheels and check the tension.
- 3. Re-adjust as required.

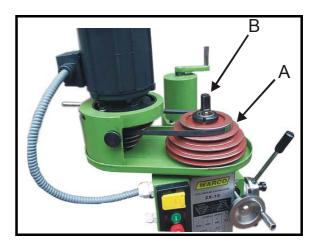


Fig. 14

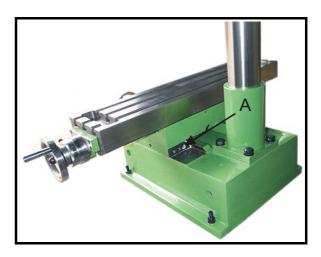


Fig. 15

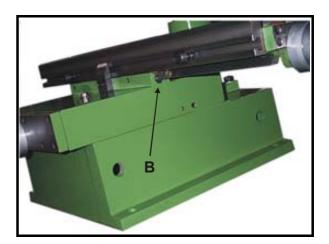


Fig.16



ZX-15 MILL PARTS LIST

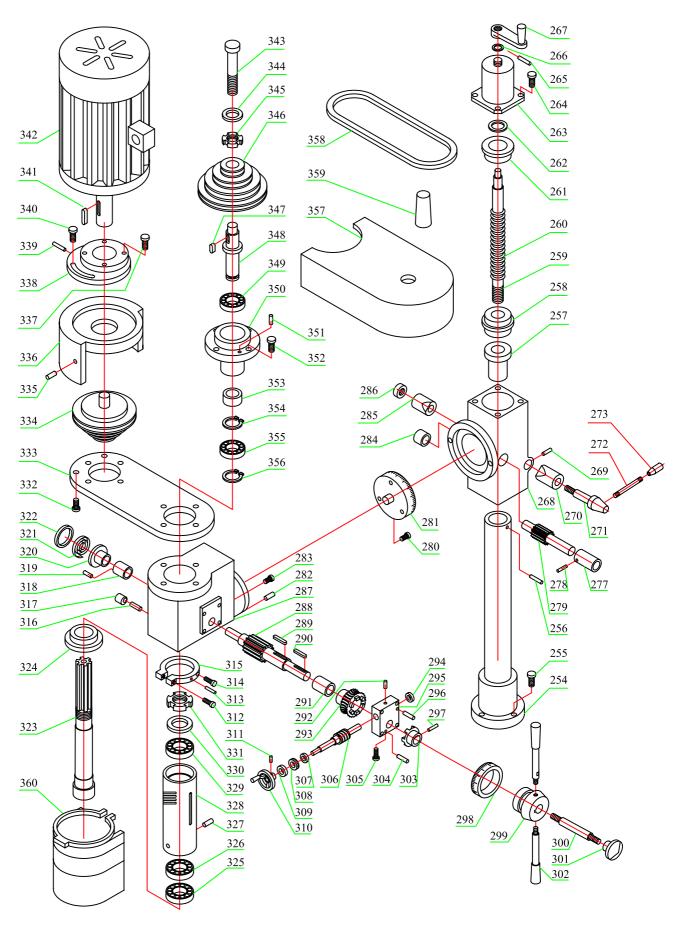


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ZX-15 Mill Head



ZX-15 Mill Head, Column Assembly I

Index No.	Parts No.	Description	Qty
1	254	Column	1
2	255	Screw 1	
3	256	Pin 1	
4	257	Nut	1
5	258	Sleeve	1
6	259	Lead Screw	1
7	260	Spring	1
8	261	Support	1
9	262	Bearing	1
10	263	Housing	1
11	264	Screw	1
12	265	Pin	1
13	266	Washer	1
14	267	Crank Handle	1
15	268	Adjusted Base	1
16	269	Screw	1
17	270	Locking Block	1
18	271	Handle Base	1
19	272	Handle	1
20	273	Handle Cover	1
21	277	Sleeve	1
22	278	Pin	1
23	279	Worm	1
24	280	Screw	3
25	281	Worm Gear	1
26	282	"T" Screw	2
27	283	Nut	2
28	284	Bush	1
29	285	Locking Block	1
30	286	Plug	1
31	287	Mill Head	1
32	288	Gear Shaft	1
33	289	Key	1
34	290	Key	1
35	291	Bush	1
36	292	Oil Cup	1
37	293	Worm Gear	1
38	294	Bush	1
39	295	Worm Base	1
40	296	Screw	1
41	297	Screw	1
42	298	Dial 1	
43	299	Handle Base	1
44	300	Bolt 1	
45	301	Knob	1

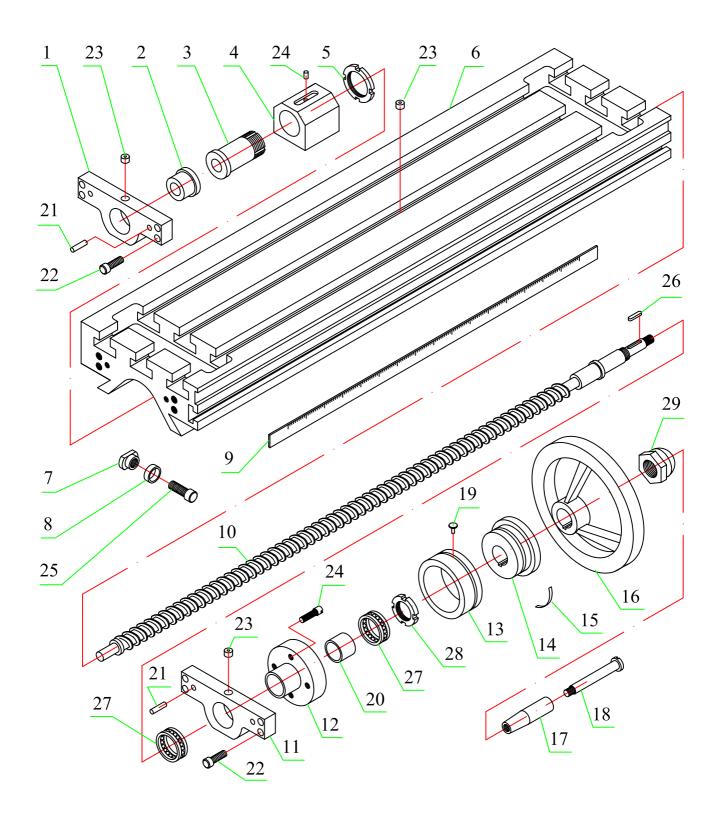
ZX-15 Mill Head Assembly II

Index No.	Parts No.	Description	Qty
46	302	Handle	2
47	303	Clutch	1
48	304	Pin	1
49	305	Screw	1
50	306	Worm	1
51	307	Sleeve	1
52	308	Dial	1
53	309	Locking Nut	1
54	310	Handwheel	1
55	311	Pin	1
56	312	Screw	1
57	313	Pin	1
58	314	Screw	1
59	315	Locking Ring	1
60	316	Key	1
61	317	Pin	1
62	318	Bush	1
63	319	Pin	1
64	320	Spring Housing	1
65	321	Worm Spring	1
66	322	Cover	1
67	323	Spindle	1
68	324	Cover	1
69	325	Bearing	1
70	326	Bearing	1
71	327	Oil Cup	1
72	328	Spindle Sleeve	1
73	329	Bearing	1
74	330	Washer	1
75	331	Nut	1
76	332	Screw	5
77	333	Lower Housing	1
78	334	Motor Pulley	1
79	335	Screw	2
80	336	Motor Base	1
81	337	Screw	4
82	338	Adjusted Plate	1
83	339	Screw	1
84	340	Screw	1
85	341	Key	1
86	342	Motor 1	
87	343	Screw	1

ZX-15 Mill Head Assembly III

Index No.	Parts No.	Description	Qty
88	344	Washer	1
89	345	Nut	1
90	346	Spindle Pulley	1
91	347	Key	1
92	348	Spline Sleeve	1
93	349	Bearing	1
94	350	Bearing Housing	1
95	351	Pin	1
96	352	Screw	3
97	353	Separator	1
98	354	Spring Ring	1
99	355	Bearing	1
100	356	Spring Ring	1
101	357	Belt Cover	1
102	358	Belt	1
103	359	Drawbar Cover	1

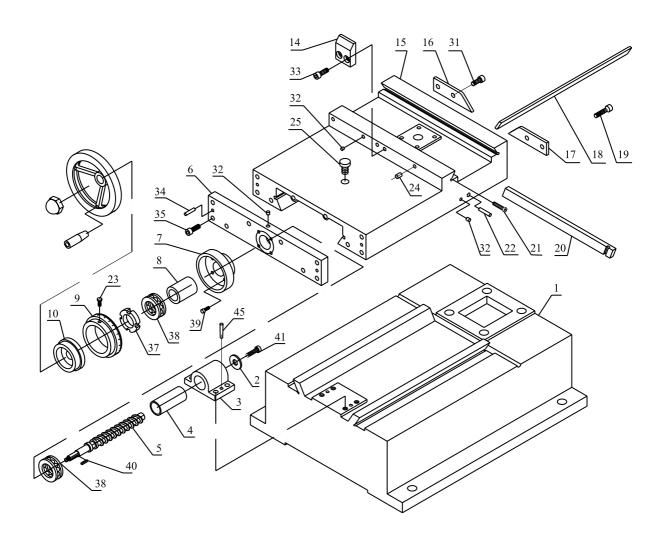
ZX-15 Table Assembly



ZX-15 Table Assembly

Index No.	Parts No.	Description	Qty
104	1	Left Support	1
105	2	Bush	1
106	3	Sleeve	1
107	4	Nut	1
108	5	Nut	1
109	6	Table	1
110	7	"T" Nut	2
111	8	Washer	2
112	9	Dial Label	2
113	10	Lead Screw	1
114	11	Right Support	1
115	12	Bearing Housing	1
116	13	Dial	1
117	14	Base	1
118	15	Zero Dial	1
119	16	Handwheel	1
120	17	Handle Sleeve	1
121	18	Handle Screw	1
122	19	Locking Screw	1
123	20	Separator	1
124	21	Pin	2
125	22	Screw	4
126	23	Oil Cup	1
127	24	Oil Cup	1
128	25	Screw	2
129	26	Key	1
130	27	Bearing	2
131	28	Nut	1
132	29	Nut	1

ZX-15 Saddle, Base Assembly



ZX-15 Saddle, Base Assembly			
Index No.	Parts No.	Description	Qty
133	1	Base	1
134	2	Washer	1
135	3	Nut Housing	1
136	4	Nut	1
137	5	Screw	1
138	6	Support	1
139	7	Bearing Housing	1
140	8	Separator	1
141	9	Dial	1
142	10	Handlewheel Base	1
143	11	Handlewheel Base	1
144	12	Nut	1
145	13	Handle	1
146	14	Stop Lock	1
147	15	Saddle	1
148	16	Wiper	1
149	17	Screw	1

ZX-15 Saddle, Base Assembly			
Index No.	Parts No.	Description	Qty
150	18	Taper Gib	1
151	19	Screw	1
152	20	Taper Gib	1
153	21	Screw	1
154	22	Locking Screw	1
155	23	Locking Screw	1
156	24	Locking Screw	1
157	25	Oil Plug	1
158	31	Screw	2
159	32	Oil Cup	3
160	33	Screw	2
161	34	Pin	2
162	35	Screw	8
163	37	Nut	1
164	38	Bearing	2
165	39	Screw	2
166	40	Key	1
167	41	Screw	1