



## METAL & WOODWORKING MACHINERY AND ACCESSORIES

Directions to Warco from M25 Leave at Junction 10, heading South on A. Leave A3 at A283 slip road. Remain on the A283 to Chiddingfold (cricket green and school on right hand side).

Take next left, signposted Plaistow. Follow this road-Pickhurst Lane - leading to Fisher Lane. Warco House is on right hand side, 2½ miles from A283 turning.

### Warren Machine Tools Co. (WARCO)

Warco House, Fisher Lane, Chiddingfold  
Surrey, GU8 4TD, United Kingdom

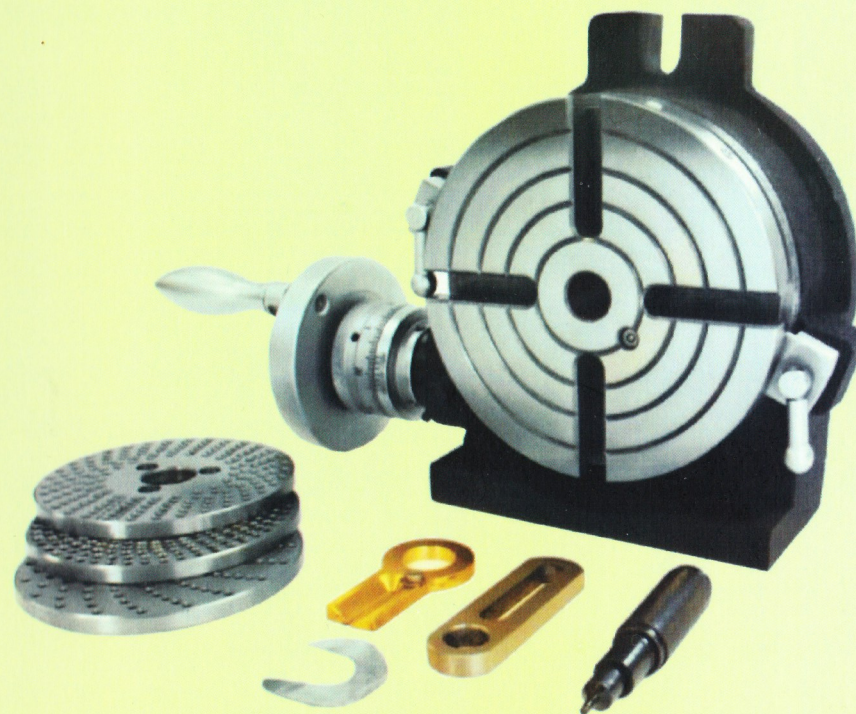
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## HORIZONTAL & VERTICAL ROTARY TABLE GENERAL INFO & OPERATION MANUAL



BY WARCO - QUALITY MACHINE TOOLS

Warren (WARCO) Machine Tools/ General Information & Operation Manual & Horizontal & Vertical Rotary Table

**Important Note :**

Before you read this out, we congratulate you for buying this extensively useful & multi-purpose quality product.

Please read this manual's complete details thoroughly to become familiar with the controls and operations of this product before you start to assemble, install, operation maintain it. Product yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and or property damage!

**Declaration :**

This book is a general guidelines about & designed to provide you a basic know how, usage & maintenance of the product. This book in no way a detailed comprehensive information booklet for all of the application of this equipment. You must do some Google search, read out some relevant trade magazines or articles in order to maximize your knowledge about its application.

**Caution :**

Never use highly volatile solvents. Avoid getting cleaning solution on paint, as it may tend to deteriorate these finishes. Use soap and water on painted components.

**General Safety Information**

1. Read and follow all operating instructions before operating rotary table.
2. Understand and obey all safety instructions supplied with mill or other machines on which the rotary table is to be used.
3. Ensure to secure rotate table to work surface or other machine.
4. Ensure to always secure work piece to rotary table clamping surface if used.
5. Always secure face plate to rotary table clamping surface if used.
6. Always secure rotary table clamping surface with lock-down handles when possible.
7. Maintain and lubricate property through Oiling Nipple given on the Rotary Table.

- 8 Keep the rotary table clean of the dirt or chips.
- 9 Pls wear Safety Glasses during your working with this machine.
- 10 Always keep the work station clean and full of lighting.

**Installation**

- 1 Mount rotary table security to machine work surface.
- 2 Use slots provided on table and be sure that table is rigidly and safety secured.
- 3 Table can be mounted horizontally or vertically with slots provided.

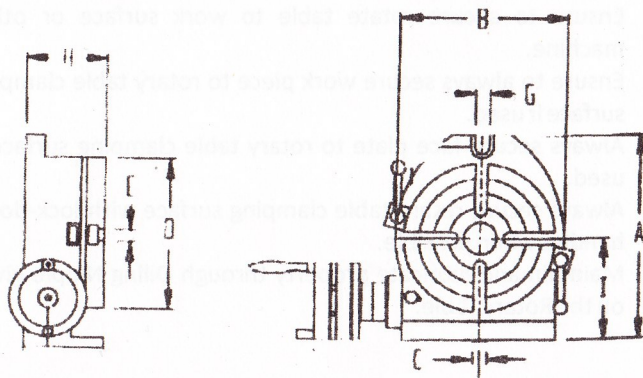
**Item: Horizontal Vertical Rotary Table**

**Description**

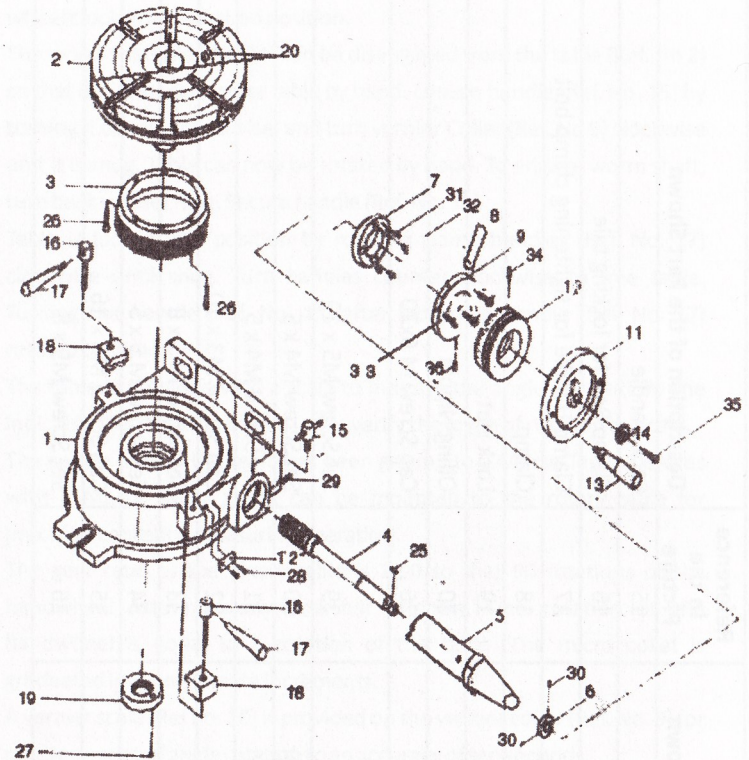
This Horizontal Vertical Rotary Table has been so specially designed for a high precision work which allows its operator to mill or drill any components at exact intervals around a fixed axis. It is widely used for circular cutting work, angle setting, boring, spot - facing and any other similar operation in conjunction with a milling machine. Additional indexing plates can be fitted to allow the Rotary Table to be used as a Dividing Head.

As the name specifies, this Rotary Table can be used in both the horizontal or vertical plane as per the need.

Model	Table			Base Dimension			Width of the T-Slot		Bolt Slots	Centre Slv	Net Weight (In Kgs)	
	Outer Diameter		Height	I	A	B	E	C				
	A	D	H						TYPE	G		
HV 4	150	110	77	88	150	120	11.5	18.5	3 Slots	NA	MT-2	8 Kgs
HV 6	208	150	82	102	208	170	11	18.5	4 Slots	16	MT-2	12 Lgs



**Disassembled View of HV6 Rotary Table & Its Parts Details**



★ The shape of the parts shown in picture may vary a bit than actual as this is just a pictorial representation for the understanding of the end user.

★ Above presentation is for HV6 Rotary but HV4 has also the similar pattern of assembly with visual differences in its main body (ref 1) & table, which has 3 slots (ref 2)

Reference in the Picture	Description of the Part Shown	Reference in the Picture	Description of the Part Shown
1	Main Rotary Body	15	Lock Handle
2	Table	16	Clamp Bolt for locking tale
3	Worm Gear	17	Clamp Handle for tightening clamp bolt
4	Worm Shaft	18	Clamp
5	Eccentric Housing	19	Lock Nut
6	Collar Lock	20	Oiling Nipple
7	Holding Cover	26	Cap Screw M 6x20
8	Pin for Moving the Handle Assembly	29	Set Screw M5 x 12
9	Vernier Collar/0-60-0 Collar	30	Set Screw M4 x 5
10	Handwheel dial	31	Set Screw M4 x 5
11	Handwheel	32	Cap Screw M3 x 10
12	Pointer	33	Set Screw M 5 x 8
13	Handle	34	Set Screw M 5 x 5
14	Spacer	35	Cap Screw M6 x 16
		36	Set Screw M5 x 8

### Operation

1. Always rotate hand wheel (Ref. No. 11) clockwise. This will eliminate any backlash in the worm gear. If hand wheel is rotated past desired position, rotate hand wheel one full turn counter clockwise and then rotate hand wheel clockwise to desired position.
2. The worm shaft (Ref. No.04) can be disengaged from the table (Ref. No 2) so that operator can rotate table by hand. Loosen handle (Ref. No. 15) by turning it counter clockwise, and turn vernier Collar (Ref. No 9) clockwise unit it is snug. Table can now be rotated by hand. To engage worm shaft, turn back vernier Ring. Secure handle (Ref. No. 11)
3. Table is locked into position by rotating clamp handles (Ref. No. 17) clockwise until snug. Turn handles counter clockwise to free table. Turning the handle (Ref. No. 11) after loosening handle (Ref. No. 17) rotated the table.
4. The table is provided with a scale to indicate the angle of rotation. The indicator (Ref. No.12) can be used to verify the angle of rotation on scale.
5. The centre hole of the table has been ground to a Morse Taper. Centres with a Morse Taper shank can be mounted to the rotary table for precision centering measuring operation.
6. The gear ratio of the rotary table is 1:90 so that 90 rotations of the handwheel rotate exactly one full rotation. One rotation of the handwheel is equal to 4 rotation of the table. The micro collar is graduated into one minute increments.
7. A vernier scale (Ref no. 10) is provided on the vernier collar (Ref. No. 9) for measerment of angle rotation to an accuracy of ten seconds.
8. Read the degrees and minutes from the Handwheel Dial and use the vernier collar scale to read ten seconds.

**Using Dividing Plates for Indexing a Rotary Table.**

Dividing plates allow you to precisely divide a circle into a number of divisions or degrees. The Indexing feature, which is basically an operation of dividing a periphery of a cylindrical work piece into equal number of divisions by the help of index crank and index plate. A manual indexing head includes a hand crank, called a crank handle. Rotating the hand crank in turn rotates the spindle and therefore the work piece. The hand crank uses a worm gear drive to provide precise control of the rotation of the work. The work may be rotated and then locked into place before the cutter is applied, or it may be rotated during cutting depending on the type of machining being done.

**Equation of Indexing**

Since the work ratio is 1:90, when the handle is rotated by a 360 degree revolution, the table therefore will rotate a 1/90 revolution. The relationship between handle revolution "N" and dividural number "T" to be sought are show in the following equation.

$$N=90/T$$

**Remarks :**

The index table below is made on the basis of this equation for easy reference of its end user.

Below is the illustration for better understanding.

In case where the operator wants to index the position divided into 29 equal parts. As for 29 dividural numbers, the number of crank handle revolutions (N) is 3 9/87 as shown in the table. This means that the handle should be rotated a full 360 degree revolution 3 times plus an interval of 9 holes (this means hole interval and not the hole number). After setting this point as a starting point, rotate the handle a full 360 degree revolution 3 times plus an interval of nine holes.

When the Procedure is repeated in turn as many as 29 times, the indexing of dividing into 29 equal parts is achieved.

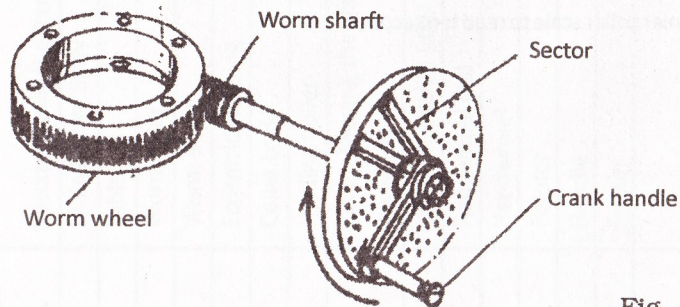


Fig. 4

**Operating of Crank, Handle & Sector :-**

In Case of the above example of "Division into 29 equal parts", it is natural that the indexing operation should proceed with the intervals of 9 holes after setting the Index plate (B plate) on which a raw of 87 holes are provided. But in this method, the operation has to count 9 holes intervals one by one. He must feel inefficient. In this viewpoint, it is necessary to use a device call 'sector' to avoid such troublesome procedures. The following will describe some necessary procedures for operation of the sector.

A/ Loosen the crank handle lock nut, adjust its length so as to cause the index pin to fall in the train of 87 holes and then retightent.

B/. Loosen the set screws of the sector, open the tow arms in accordance with the interval of 9 holes (total no. of holes will be 10) and then re-tighten the set screws.

C/. First, bring the left arm of the sector near to the index pin's left side.

D/. Next, rotate the crank handle clockwise to apply it to the right arm of the sector so that the index pin will fall in the hole located at this right arm's left side surface.

E/. Rotate the sector Clockwise this time, and put ther right side surface of the left arm to the left side of the Index Pin and the sector's left arm in their positions are the same as in Point C). The Index plate hole that actually accommodates the index pin is located at the point where goes across 10 holes to the right away from the hole as in Point C).

F/. Repeat the same procedures as necessary.

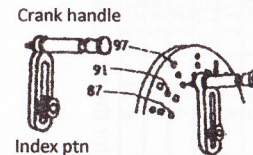


Fig. 5

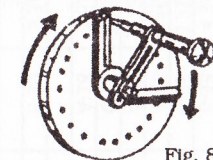


Fig. 8

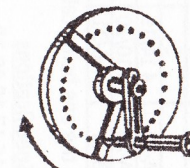


Fig. 6

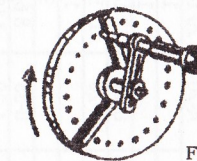


Fig. 7

	Plate-B	N	I	Plate-H	N	F	Plate-H	N	7	Plate-H	N	T	Plate-H	N
1			22	B-33	4 + 3/33	43	C-43	2 + 4/43	64			85		
2	45		23	B-23	3 + 21/23	44			65	C-39	1 + 15/39	86	C-43	1 + 2/43
3	30		24	A-20	3 + 18/20	45		2	66	B-33	1 + 12/33	87	B-29	1 + 1/29
4	A-20	20 + 10/20	25	A-20	3 + 15/20	46	B-23	1 + 22/23	67			88		
5	18		26	C-39	3 + 18/39	47	C-47	1 + 43/47	68			89		
6	15		27	A-18	3 + 6/18	48	A-16	1 + 14/16	69	B-23	1 + 7/23	90		1
7	B-21	12 + 18/21	28	A-18		49	C-49	1 + 41/49	70	B-21	1 + 6/21	91		
8	A-20	11 + 5/20	29	B-29	3 + 3/29	50	A-20	1 + 16/20	71			92		
9	10		30		3	51			72	A-20	1 + 5/20	93	B-31	30/31
10	9		31	B-31	2 + 28/31	52			73			94	C-47	45/47
11	B-33	8 + 6/33	32	A-16	2 + 13/16	53			74	C-37	1 + 8/37	95	A-19	18/19
12	A-20	7 + 10/20	33	B-33	2 + 24/33	54	A-18	1 + 12/18	75	A-20	1 + 4/20	96	A-16	15/16
13	C-39	6 + 36/39	34	A-17	2 + 11/17	55	B-33	1 + 21/33	76			97		
14	B-21	6 + 9/21	35	B-21	2 + 12/21	56			77			98	C-49	45/49
15	6		36	A-20	2 + 10/20	57	A-19	1 + 11/19	78	C-39	1 + 6/39	99	B-33	30/33
16	A-16	5 + 10/16	37	C-37	2 + 16/37	58	B-29	1 + 16/29	79			100	A-20	18/20
17	A-17	5 + 5/17	38	A-19	2 + 7/19	59			80	A-16	1 + 2/16			
18	5		39	C-39	2 + 12/39	60	A-20	1 + 10/20	81	A-18	1 + 2/18			
19	A-19	4 + 14/19	40	A-20	2 + 5/20	61	B-31		82	C-41	1 + 4/41			
20	A-20	4 + 10/20	41	C-41	2 + 8/41	62	B-31	1 + 14/31	83					
21	B-21	4 + 6/21	42	B-21	2 + 3/21	63	B-21	1 + 9/21	84					

Plate A: 15, 16, 17, 18, 19, 20

Plate B: 21, 23, 27, 29, 31, 33

Plate C: 37, 39, 41, 43, 47, 49

T = Desired Division

H = Hole Option in Dividing Plate

N = Crank Rotations / Holes