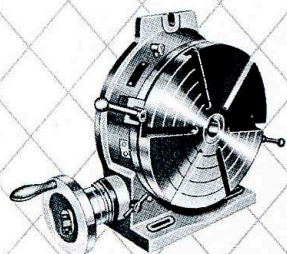# OPERATION AND SERVICE MANUAL

For Rotary Table

OPERATION AND SERVICE MANUAL

# (HV,RT) H V. & RT. TYPE Rotary Tables

Two types of Rotary tables are summerized here collectively. The mechanisms common to these tables are shown on some page of their description.

Horizontal & Vertical Rotary Table (HV)

This H.V. Type Rotary Table is so designed as to permit machining operations at a higher dimension than that of RT Type Rotary tables. The base can be used in a vertical position to enabling to carry out center work.

Order No. & Dimensions

Unit:mm/inches

Order NO.	Table		Base dimension			Width of T-solts		Bolt slots	Center sleeve	Gross Weight kg/lb wooden case(W) Carton(C)	Meas. CFT	CODE NO.
	Outer diameter	Height										
	A1	D	H	H1	A	B	e	Type	g				
HV-4	70	110	80	85	145	115	11	✹	12	MT-2	(C) 9.0	0.3	1001-000
HV-6	78 3.07	150 5.91	80 3.11	100 3.94	200 7.87	160 6.30	11 0.43	✹	15 0.59	MT-2	(C) 12 26.4	0.4	1001-001
HV-8	100 3.94	200 7.87	105 4.13	135 5.31	265 10.43	220 8.66	14 0.55	✹	17 0.67	MT-3	(C) 30 66.1	0.8	1001-002
HV-10	110 4.33	250 9.84	115 4.53	165 6.50	325 12.80	280 11.02	14 0.55	✳	17 0.67	MT-3	(C) 45 99	2	1001-003
HV-12	130 5.12	300 11.81	135 5.32	195 7.68	388 15.27	330 12.99	16 0.63	✳	18 0.71	MT-4	(W) 85 187	2.6	1001-004
HV-14	130 5.12	350 13.78	140 5.51	230 9.06	450 17.72	380 14.95	16 0.63	✳	18 0.71	MT-4	(W) 100 220	3.2	1001-005
HV-16	150 5.90	406 15.98	155 6.10	255 10.03	500 19.69	430 16.93	16 0.63	✳	18 0.71	MT-4	(W) 135 297	4.2	1001-006
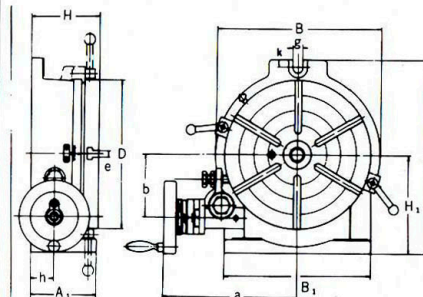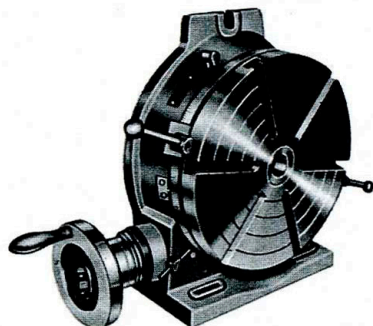
Horizontal Rotary Table (RT)

This Rotary table is widely used for circular cutting work, angle setting, boring, spot-facing and similar work in conjunction with a milling machine. (Refer to Page 2)

Order No. & Dimensions

Order No.	Table		Base dimension		Width of T-slot		Bolt slots	Center sleeve	Weight kg/lb	Worm Gear ratio
	Outer diameter	Height								
	D	H	A	B	e	Type	g			
RT-6	150 5.91	78 3.07	210 8.27	184 7.24	10 0.39	⊕	10 0.39	MT-2	10.0 22.0	90:1
RT-8	200 7.87	105 4.13	280 11.02	250 9.84	12 0.47	⊕	14 0.55	MT-3	25.0 55.1	90:1
RT-10	250 9.84	115 4.53	340 13.39	300 11.81	12 0.47	✳	16 0.63	MT-3	37.0 81.5	90:1
RT-12	300 11.81	135 5.32	400 15.75	364 14.33	14 0.55	✳	18 0.71	MT-4	60.0 132.2	90:1
RT-14	350 13.78	140 5.51	460 18.11	420 16.54	14 0.55	✳	18 0.71	MT-4	85.0 187.3	90:1

(RT) Horizontal Rotary Table
EXPLODED VIEW

Part No.	Parts Names
RT-01	Base
RT-02	Table
RT-08	Worm metal
RT-11	Metal setting screw
RT-17	Clamp Piece
RT-18	Clamp bolt
RT-19	Clamp handle

Operating Instruction and Function of Each Unit

1. Turn the handle clockwise at all times. When this handle has been turned until it passes the desired position, turn back it once counterclockwise to a great extent and then softly rotate it clockwise so as not to cause the backlash of the gear.

2. When turning the right and left table stoppers **19** inwards concurrently, they are pushed down because the projected part of the stopper Piece **17** is fitted into the slot section on the center of the side of the table, thus clamping the table. The bolt **18-2** is a left-handed screw and the bolt **18** is a right-handed one.

3. The center hole has a Morse tapered sleeve, so that jigs and measuring apparatus can be fitted with precision.

4. The worm gear ratio is 1:90. As a result, 90 turns of the handle lead to one turn of the table, and the table moves 4 $(360° \div 90 = 4°)$ for one turn of the handle.

5. Dividing of 2 to 100 can be carried out quickly and accurately by attaching a Dividing Mechanism (See Page 5).

6. Loosen the metal clamp handle **11** and rotate the switch metal **10** until it touches the stopper. The worm gear and wheel have now been disengaged, thus enabling to turn the table manually.

Worm shaft
Main body
Worm metal
Screw A
Steel ball
Screw B
Showing section Ⓐ Ⓑ　Fig.1
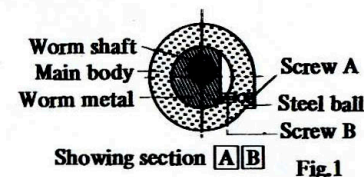
1. **Adjusting Mesh of Worm Gear:** Loosen the matal clamp handle and turn the switch metal clockwise until it touches the stopper. The worm gear has now been disengaged. Turn it counterclockwise until it touches the stopper, the worm and gear wheel will engage. Tighten the metal clamp handle after engagement. An additional adjustment can be obtained by removing the screw Ⓐ and steel ball and turning the inner screw Ⓑ counterclockwise, so bringing the worm in closer engagement with the gear wheel. Turning clockwise brings the worm away from the wheel. After adjustment insert the steel ball and tighten the screw Ⓐ

2. **Axial Adjustment of Worm Shaft:** When axial slack occurs gear adjustment is carried out by tightning the inside worm shaft nut after the handle, vernier ring and switch metal have been removed. After adjustment, lock the nut on the shaft by means of the set screw. (The RT-150 has an adjusting nut, which can be used after removal of the handle.)

(HV) Horizontal and Vertical Rotary Table

EXPLODED VIEW
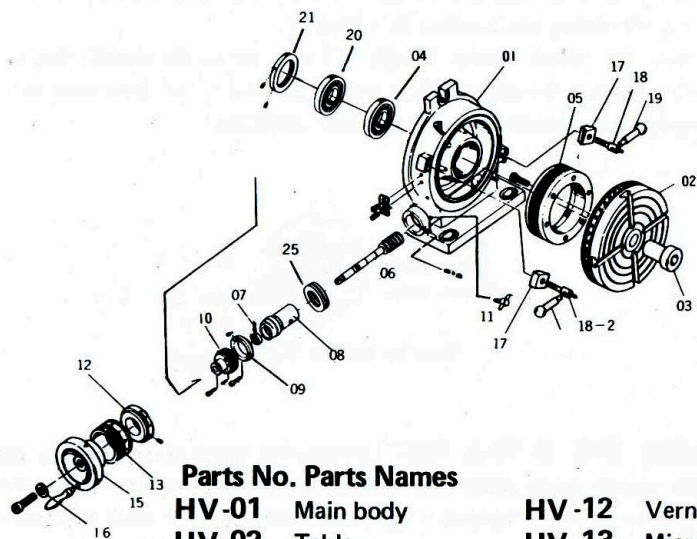
Parts No.	Parts Names	Parts No.	Parts Names
HV-01	Main body	HV-12	Vernier ring
HV-02	Table	HV-13	Micro-collar
HV-05	Worm wheel	HV-17	Clamp piece
HV-08	Worm metal	HV-18	Clamp bolt
HV-11	Metal setting screw	HV-19	Clamp handle

Operating Instruction and Function of Each Unit

1. The worm gear ratio is 1 : 90.
   - One turn of the handle moves the table by 4°
   - Micro-collar is graduated in steps of 1 min.
   - Vernier scale makes settings down to 10 seconds possible.
   (20 seconds for HV-150)

2. Dividing of 2 to 100 can be carried out quickly and accurately by attaching a Dividing Mechanism.

3. Center work can also be carried out by using the base in the vertical position in conjunction with a tailstock. (See Page 4.)

4. The worm gear engagement is adjusted by the switch metal in the same manner as that of (**RT**). (See Page 2.)

* Suggestions for Order

The parts names expressed in the operation and service manual are abbreviated for description.

Therefore, when ordering parts for replacement, be sure to specify article marks, article Nos. and component Nos., which are shown in the table of Order No. & Dimensions.

| RT	—	200	—	19
Article Mark		Article No.		Component No.

Special Accessories

Tailstock

The height can be varied when working with different index centers, while the angle of inclination can be changed for various machining applications. In addition, the tip of the center is finely rotatable. Clamping is made by means of the lever handle.
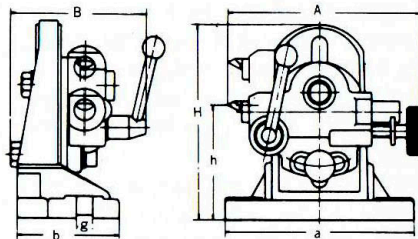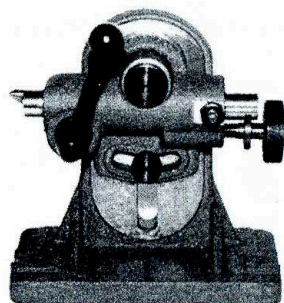
Order No. & Dimensions for Tail Stock Unit: mm/in.

Order No.	Center Height		Suitable for
	Max.	Min.	
TS-1	131 5.15	97 3.81	HV-150
TS-2	166 6.53	103 4.05	HV-200 HV-250
TS-3	210 8.26	160 6.29	HV-300
TS-4	300 11.81	210 8.27	HV-350 HV-400 HV-500

Dividing Mechanism
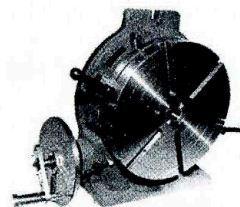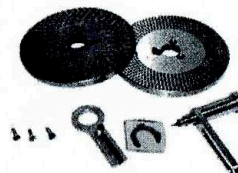
HV with DP
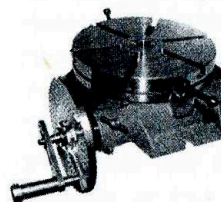
RT with DP

DP SETS

Dividing Plates (A plate and B plate)   each   1
Sector   1
Crank handle   1
Sector spring   1
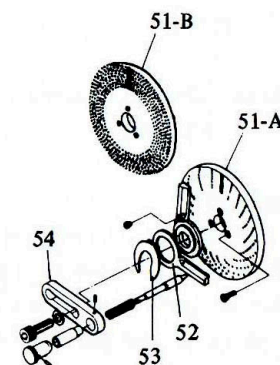
Order No. & Dimensions   Unit: mm/in

Order No.	Major dimension of DM				Weight kb/lb	Shipping measurement ft	Applicable table
	Dividing plate set screw	Inner diameter of sector arm	Outer diameter of spring clip	Grove width in handle plate			
DP-1	PCD.32 1.26 ⌀	21 0.83	18 0.71	9 0.03	2.5 5.51	0.12	HV-6 RT-6
DP-2	(3holes) PCD.46 1.81	28.7 1.12	44 1.73	10 0.39	4 8.82	0.12	HV-8 RT-8
DP-3·4	(3holes) PCD.46 1.81	28.7 1.12	44 1.73	10 0.39	4 8.82	0.12	HV 10.12 RT 14 CS- 6.8

In case of An Optional DM Device Attached

Indexing of 2 to 100 can be made accurately and quickly.

Equation of Indexing

Since the worm ratio is 1 : 90, when the handle is made to rotate a 360° revolution, the table therefore will rotate a 1/90 revolution. The relationships between handle revolution 'N' and dividual number 'T' to be sought are shown in the following equation:

$$N = \frac{90}{T}$$

Remarks: The index table on Page 6 is made on the basis of this equation.

(Example)

In case where the operator wants to index the position divided into 29 equal parts. Hints on operation As for 29 dividual numbers, the number of crank handle revolutions (N) is $3\frac{9}{87}$ as shown in the table on Page 6, so that the handle should be rotated a full 360° revolution three times plus an interval of nine holes (in this time, it means hole intervals not hole numbers). After setting this point as a start point, rotate the handle a full 360° revolution three 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 thus achieved.
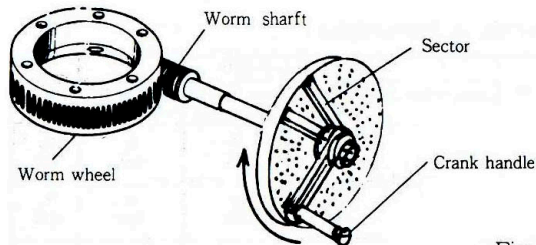

Fig. 4

Operations of Crank Handle and Sector

In case of the Example Division into 29 Equal Parts' aforesaid, it is natural that indexing operation should proceed with the intervals of nine holes after setting the index plate (B plate) on which a row of 87 holes are provided. But in this method, the operator has to count nine holes' intervals one by one. He must feel inefficient. In this viewpoint, it is necessary to use a device called '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 retighten it.
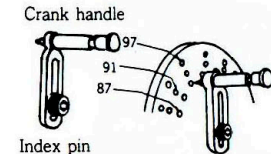
b. Loosen the set-screws of the sector, open two arms in accordance with the interval of nine holes (total numbers of holes are ten), and retighten with set-screws.

Fig. 5
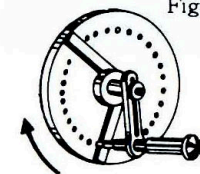
c. First, bring the left arm of the sector near to the index pin's left side.

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.

Fig. 6
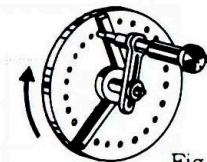
e. Rotate the sector clockwise this time, and put the right side surface of the left arm to the left side of the index pin. In this time, the relationships between the index pin and the sector's left arm in their positions are the same as in Par. c). The index plate hole that actually accommodates the index pin is located at the point where goes across ten holes to the right away from the hole as in Par. c).

Fig. 7

f. Repeat the same procedures as necessary.

Fig. 8

Index Table (For worm ratio 1:90)

DP-1 For HV-6

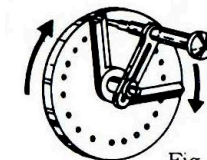| T	H	N
1		
2		45
3		30
4	A – 20	22 10/20
5		18
6		15
7	B – 21	12 8/21
8	A – 20	11 5/20
9		10
10		9
11	B – 33	8 6/33
12	A – 20	7 10/20
13	C – 39	6 30/39
14	B – 21	6 9/21
15		6
16	A – 16	5 10/16
17	A – 17	5 5/17
18		5
19	A – 19	4 14/19
20	A – 20	4 10/20
21	B – 21	4 6/21
22	B – 33	4 3/33
23	B – 23	3 21/23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

DP-2 For HV-8   DP-3 For HV-10.12.14   DP-4 For CS-6.8

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

Description of In the index table.

This table is the one being calculated for the index plate with hole numbers shown below.

Description of codes used in the index table

T : Desired dividual number
N : Number of revolution of the crank handle
H : Hole number of the index plate
  : Option
A : Using A plate
B : Using B plate

Number of holes

DP-1

A Plate....15, 16, 17, 18, 19, 20
B Plate.... 21, 23, 27, 29, 31, 33
C Plate....37, 39, 41, 43, 47, 49

DP-2·3·4

A Plate....26, 28, 30, 32, 34, 37, 38, 39, 41, 43, 44, 46, 47, 49, 51, 53, 57, 59
B Plate.... 61, 63, 67, 69, 71, 73, 77, 79, 81, 83, 87, 89, 91, 93, 97, 99