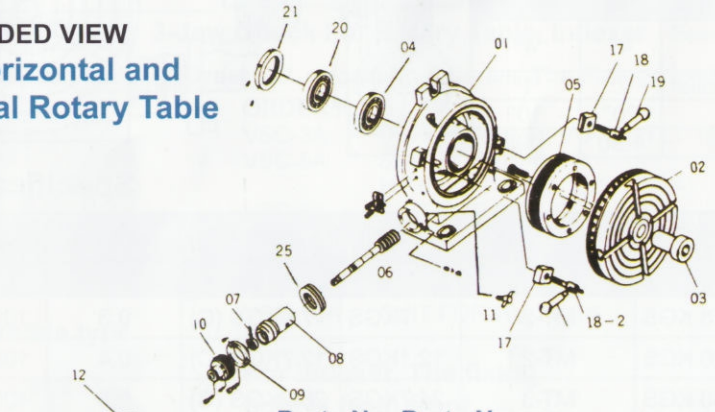
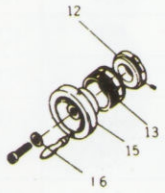
Operating Instruction and Function of Each Unit

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** turn of the handle lead to one turn of the table, and the table moves **4** (**360° ÷ 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.
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.

EXPLODED VIEW

HV Horizontal and Vertical Rotary Table





Parts No. Parts Names

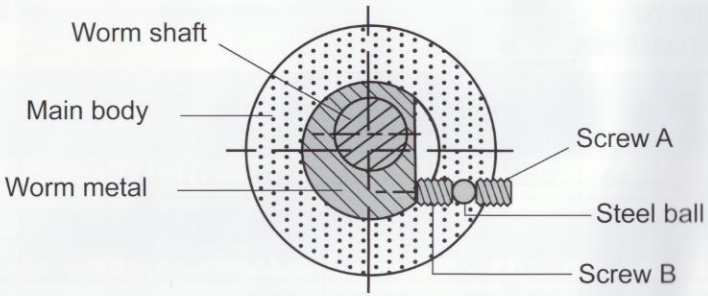
HV-01	Main body	**HV-12**	Vernier ring
HV-02	Table	**HV-13**	Micro-collar
HV-05	Worm wheel	**HV-17**	Clamp piece
HV-08	Worm metal	**HV-18**	Clamp bolt
HV-11	Metal setting screw	**HV-19**	Clamp handle

1. Adjusting Mesh of Worm Gear :

Loosen the metal 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 obt-ained 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 HV-150 has an adjusting nut, which can be used after removal of the handle.)



Showing section A B

Fig.1

In case of An Optional DM Device Attached

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

Equation of Indexing

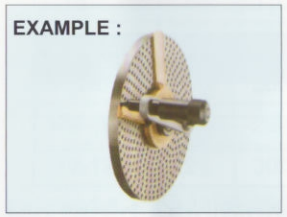
Since the worm ratio is 1:90, when the handle is made to rotate a 360° revolution, the table therefore will rotate a 1/90 revolution. The relationships between handle revolution "N" and dividual number "T" to be sought are shown in the following equation.

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

Remark: 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.



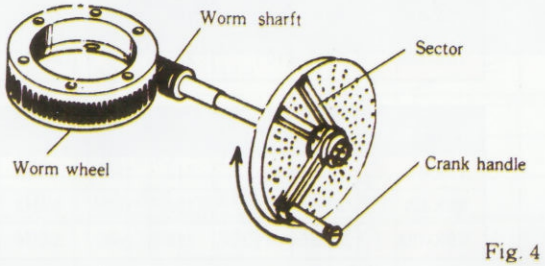


Fig. 4

Operations of Crank Handle and Sector

In case of the Example Division into 29 Equal Part's 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 hole's intervals one by one. He must feel inefficent. In this viewpoint, it is necessary to use a device called 'sectot' 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 inverval of nine holes (total numbers of holes are ten) and retighten with 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 clock wise 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 the right side surface of the left arm to the left side of the index pin. In this time, the relation ships between the index pin and the sector's left arm in their poaitions 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).
f. Repeat the same procedures as necessary.

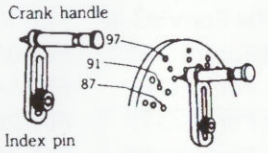


Fig. 5

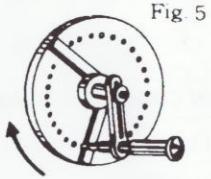


Fig. 6

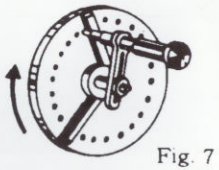


Fig. 7

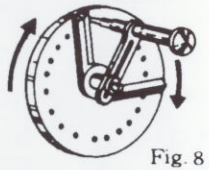


Fig. 8

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

Index Table (for worm ratio 1:90)

DP-1 For HV-6

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

DP-2 For HV-8 / **DP-3** For HV-10,12,14 / **DP-4** For CS-6,8

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