

INSTRUCTION MANUAL

HV-10 Rotary Table 254mm



R010

OPERATION AND SERVICE MANUAL

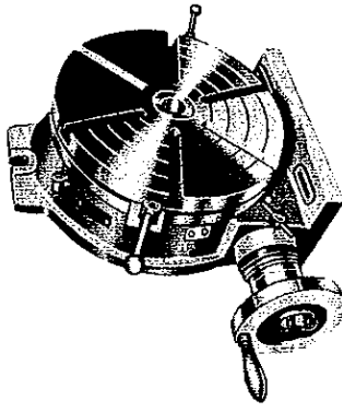
HV,RT HV. & RT. TYPE Rotary Tables

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

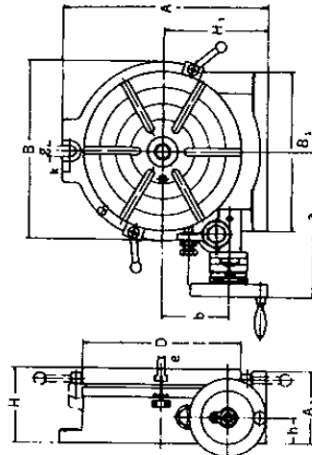
Horizontal & Vertical Rotary Table (HV) This H.V. Type Rotary Table is so designed as to permit machining operations at a higher dimension than that of RT Type Rotary tables. The base can be used in a vertical position to enabling to carry out center work.

Order No. & Dimensions

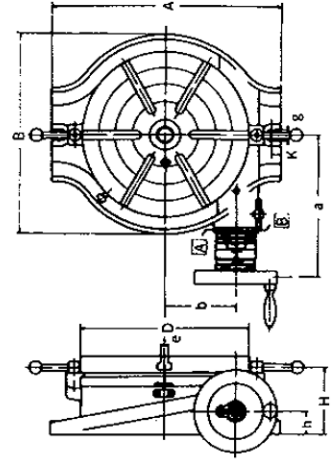
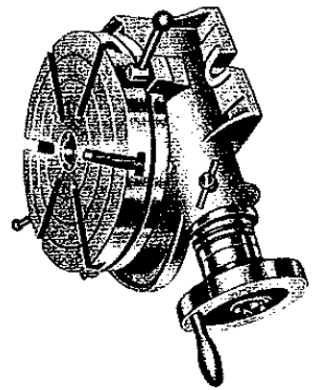
| Order No. | Outer diameter | | Height | | Base dimension | | | Width of T-slot | | | Bolt slots | Center sleeve | Weight kg/lb | Worm Gear ratio |
|-----------|----------------|-------|--------|----------------|----------------|-------|------|-----------------|------|------|------------|---------------|--------------|-----------------|
| | A | D | H | H ₁ | A | B | e | Type | | g | | | | |
| | | | | | | | | ⊕ | ⊗ | | | | | |
| HV-6 | 78 | 150 | 80 | 100 | 200 | 160 | 10 | ⊕ | 15 | MT-2 | 12 | 90:1 | | |
| | 3.07 | 5.91 | 3.11 | 3.94 | 7.87 | 6.30 | 0.39 | ⊕ | 0.59 | | 26.4 | | | |
| HV-8 | 100 | 200 | 105 | 135 | 265 | 220 | 12 | ⊕ | 17 | MT-3 | 30.0 | 90:1 | | |
| | 3.94 | 7.87 | 4.13 | 5.31 | 10.43 | 8.66 | 0.47 | ⊕ | 0.67 | | 66.1 | | | |
| HV-10 | 110 | 250 | 115 | 165 | 325 | 280 | 12 | ⊗ | 17 | MT-3 | 48.0 | 90:1 | | |
| | 4.33 | 9.84 | 4.53 | 6.50 | 12.80 | 11.02 | 0.47 | ⊗ | 0.67 | | 105.8 | | | |
| HV-12 | 130 | 300 | 135 | 195 | 388 | 330 | 14 | ⊗ | 18 | MT-4 | 77.0 | 90:1 | | |
| | 5.12 | 11.81 | 5.32 | 7.68 | 15.27 | 12.99 | 0.55 | ⊗ | 0.71 | | 169.7 | | | |
| HV-14 | 150 | 350 | 140 | 230 | 450 | 380 | 14 | ⊗ | 18 | MT-4 | 95.0 | 90:1 | | |
| | 5.12 | 13.78 | 5.51 | 9.06 | 17.72 | 14.96 | 0.55 | ⊗ | 0.71 | | 209.4 | | | |



Horizontal Rotary Table (RT)



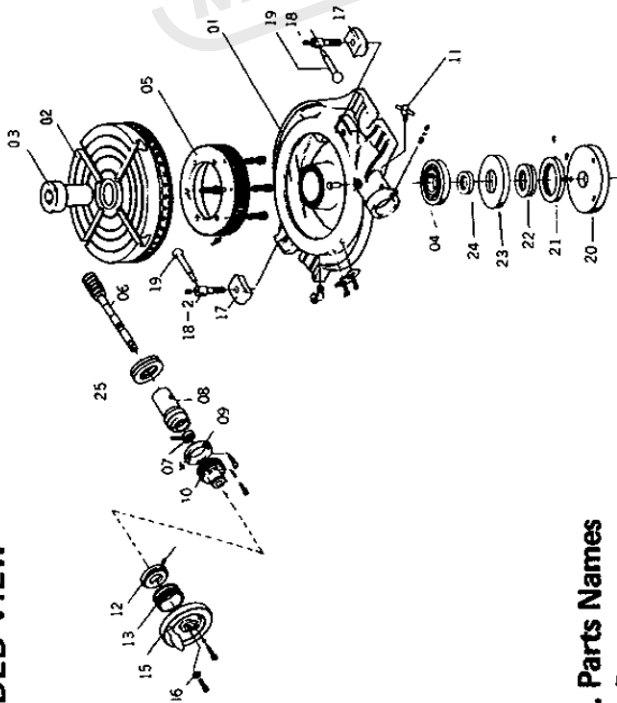
| Order No. | Outer diameter | | Height | | Base dimension | | | Width of T-slot | | | Bolt slots | Center sleeve | Weight kg/lb | Worm Gear ratio |
|-----------|----------------|-------|--------|----------------|----------------|-------|------|-----------------|------|------|------------|---------------|--------------|-----------------|
| | D | D | H | H ₁ | A | B | e | Type | | g | | | | |
| | | | | | | | | ⊕ | ⊗ | | | | | |
| RT-6 | 150 | 210 | 78 | 100 | 184 | 160 | 10 | ⊕ | 10 | MT-2 | 10.0 | 90:1 | | |
| | 5.91 | 8.27 | 3.07 | 3.94 | 7.24 | 6.30 | 0.39 | ⊕ | 0.39 | | 22.0 | | | |
| RT-8 | 200 | 280 | 105 | 135 | 250 | 220 | 12 | ⊕ | 14 | MT-3 | 25.0 | 90:1 | | |
| | 7.87 | 11.02 | 4.13 | 5.31 | 9.84 | 8.66 | 0.47 | ⊕ | 0.55 | | 55.1 | | | |
| RT-10 | 250 | 340 | 115 | 165 | 300 | 280 | 12 | ⊗ | 16 | MT-3 | 37.0 | 90:1 | | |
| | 9.84 | 13.39 | 4.53 | 6.50 | 11.81 | 11.02 | 0.47 | ⊗ | 0.63 | | 81.5 | | | |
| RT-12 | 300 | 400 | 135 | 195 | 364 | 330 | 14 | ⊗ | 18 | MT-4 | 60.0 | 90:1 | | |
| | 11.81 | 15.75 | 5.32 | 7.68 | 14.33 | 12.99 | 0.55 | ⊗ | 0.71 | | 132.2 | | | |
| RT-14 | 350 | 460 | 140 | 230 | 420 | 380 | 14 | ⊗ | 18 | MT-4 | 85.0 | 90:1 | | |
| | 13.78 | 18.11 | 5.51 | 9.06 | 16.54 | 14.96 | 0.55 | ⊗ | 0.71 | | 187.3 | | | |



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

RT Horizontal Rotary Table EXPLODED VIEW



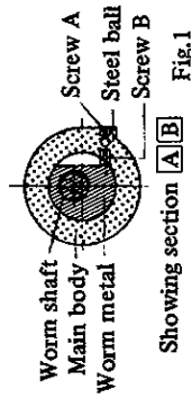
Part No. Parts Names

| | |
|-------|---------------------|
| 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.

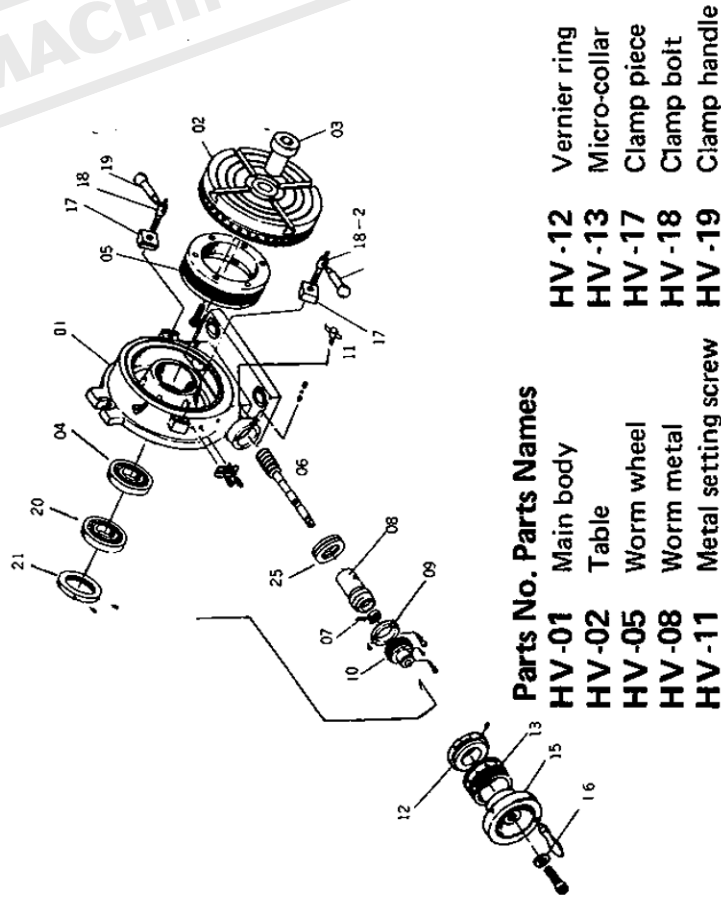
3. The center hole has a Morse tapered sleeve, so that jigs and measuring apparatus can be fitted with precision.
4. The worm gear ratio is 1:90. As a result, 90 turns of the handle lead to one turn of the table, and the table moves $4 (360^\circ \div 90 = 4)$ for one turn of the handle.
5. Dividing 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.



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 obtained by removing the screw **A** and steel ball and turning the inner screw **B** 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 **A**.

2. **Axial Adjustment of Worm Shaft:** When axial slack occurs gear adjustment is carried out by tightening 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



Operating Instruction and Function of Each Unit

- 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)

- Dividing of 2 to 100 can be carried out quickly and accurately by attaching a Dividing Mechanism.
- Center work can also be carried out by using the base in the vertical position in conjunction with a tailstock. (See Page 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.

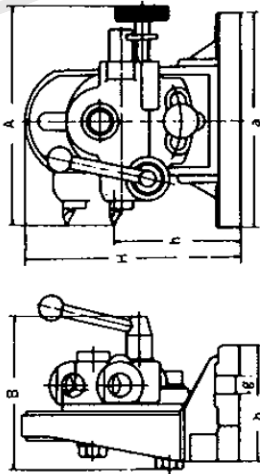
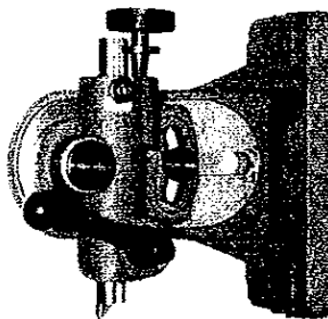
Therefore, when ordering parts for replacement, be sure to specify article marks, article Nos. and component Nos., which are shown in the table of Order No. & Dimensions.



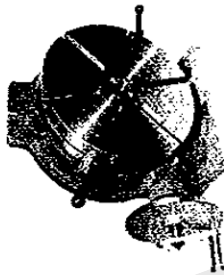
Special Accessories

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.



Dividing Mechanism



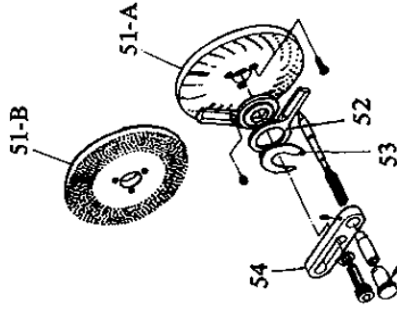
HV with DP



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 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 |

Order No. & Dimensions

| Order No. | Dividing plate set screw | Major dimension of DM | | Outer diameter of spring clip | Grove width in handle plate | Weight kb/lb | Shipping measurement ft | Applicable table |
|-----------|----------------------------------------------|------------------------------|-------------------------------|-------------------------------|-----------------------------|--------------|-------------------------|-----------------------------|
| | | Inner diameter of sector arm | Outer diameter of spring clip | | | | | |
| DP-1 | PCD ₁₂₆ ³² | 21 0.83 | 18 0.71 | 9 | 0.03 | 2.5 5.51 | 0.12 | HV-6 RT-6 |
| DP-2 | (3holes) PCD ₁₈₁ ⁴⁶ | 28.7 1.12 | 44 1.73 | 10 | 0.39 | 4 8.82 | 0.12 | HV-8 RT-8 |
| DP-3-4 | (3holes) PCD ₁₈₁ ⁴⁶ | 28.7 1.12 | 44 1.73 | 10 | 0.39 | 4 8.82 | 0.12 | HV-10,12 RT-14 CS-6,8 |

Unit: mm/in

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 $3 \frac{3}{29}$ 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.

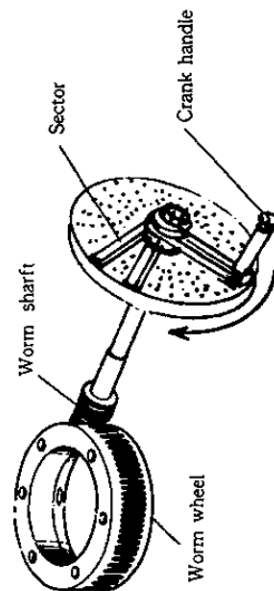


Fig. 4

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.

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 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).

f. Repeat the same procedures as necessary.

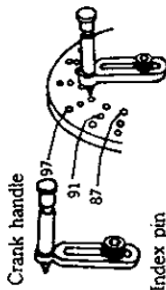


Fig. 5

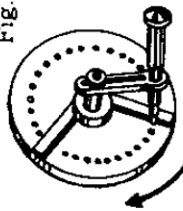


Fig. 6

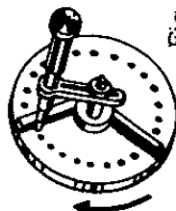


Fig. 7

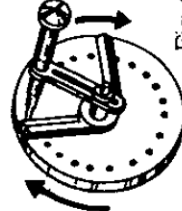


Fig. 8

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

DP-2 For HV-8 DP-3 For HV-10.12.14 DP-4 For CS-68

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


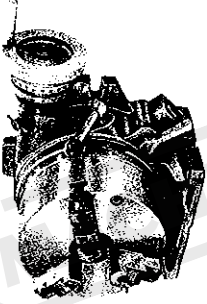
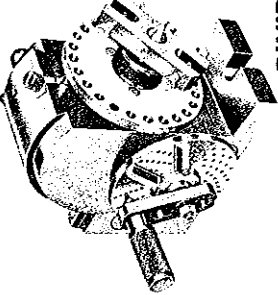
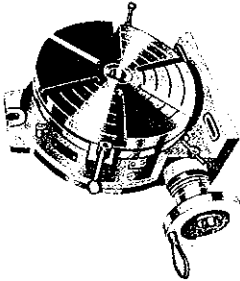
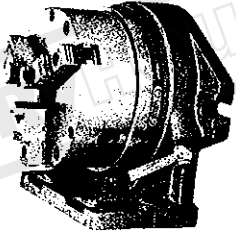
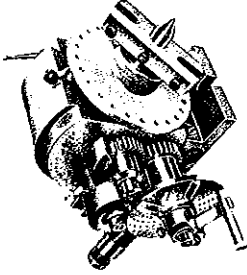
- A Plate....15, 16, 17, 18, 19, 20
- B Plate.... 21, 23, 27, 29, 31, 33
- C Plate....37, 39, 41, 43, 47, 49

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

VERTEX

PRECISION MACHINE TOOLS

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|  <p>CNC-8 . 10 . 12 . NC ROTARY TABLE</p> |  <p>SUPER SPACER INDEX</p> |  <p>DIVIDING HEAD BS-0.1.</p> |
|  <p>HV-6. 8. 10. 12. 14. ROTARY TABLE</p> |  <p>SIMPLE INDEX</p> |  <p>UNIVERSAL DIVIDING HEAD BS-2</p> |

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