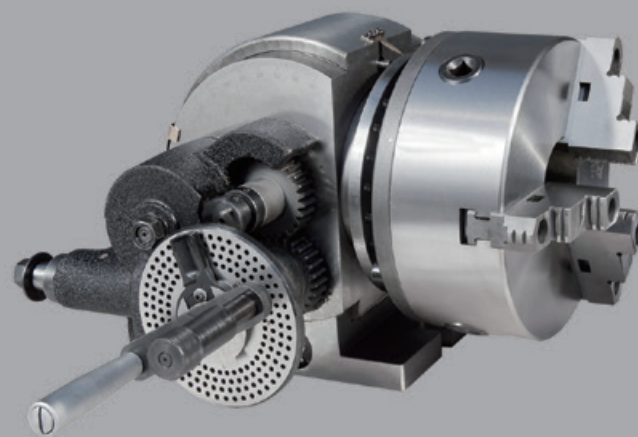


DIVIDING HEADS

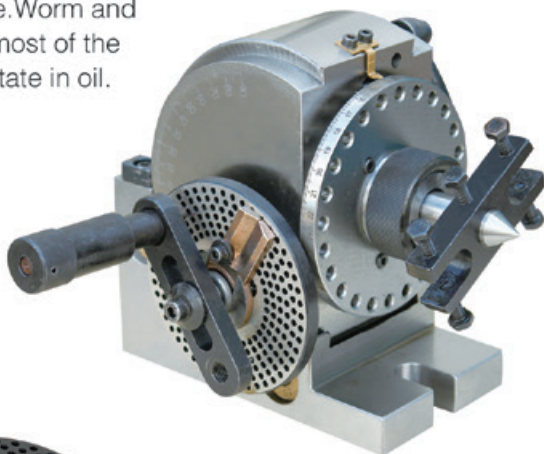
Operation Manual & Parts List



Distributed By:

These heads are suitable for milling grinding and drilling work. A plain dividing plate with 24 notches gives direct divisions of 2, 3, 4, 6, 8, 12 and 24. By indirect indexing (worm gear ratio 1:40) all divisions up to 50 and many above 50 can be carried out (see indexing chart). Divisions beyond the indirect indexing range are obtained by using the differential system which gives all divisions up to 1000. The indexing chart supplied with each head lists all divisions up to 380. Spiral milling work can also be carried out with BS-2 dividing heads.

Construction: These attachments combine rigidity with accuracy. The indexing spindle runs in precision taper roller bearings virtually free of play. In contrast to conventional designs the direct indexing plate is mounted at the tapered front indexing spindle. Dividing head and indexing spindle can be swivelled from horizontal to vertical. Indexing spindle, worm, direct indexing pin are hardened and ground, as well as centers and indirect indexing pin. The wormwheel is made of a special hard phosphor-bronze. Worm and wormwheel as well as most of the other revolving parts rotate in oil.



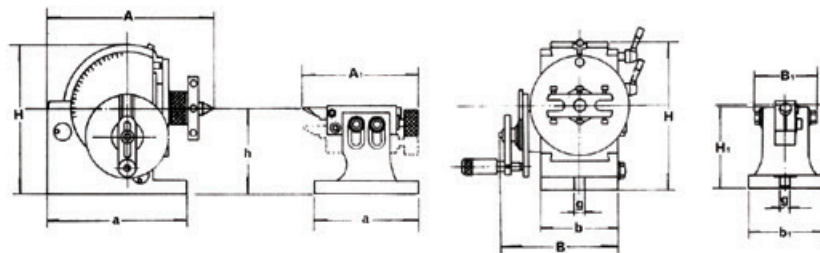
Semi-Universal Dividing Head

ENCLOSURE:

1. Fixed tailstock
2. Carrier
3. Center for head and tailstock
4. Direct indexing plate with 24 notches
5. Indirect indexing plate with 18 circles of holes 15-49
 - A 15, 16, 17, 18, 19, 20
 - B 21, 23, 27, 29, 31, 33
 - C 37, 39, 41, 43, 47, 49
6. 12 change gears for differential and spiral milling. (only BS-2)
7. Change gear quadrant and 2 bolts (only BS-2)
8. Flange plate
9. Test certificate
10. Operating instructions
11. Indirect dividing table
12. Differential dividing table (only fitting BS-2)
13. Table for spiral milling (only fitting BS-2)

THREAD SPINDLE: BS-0 1-1/2" -8TPI
BS-1 1-1/2" -8TPI

Standard Accessories:



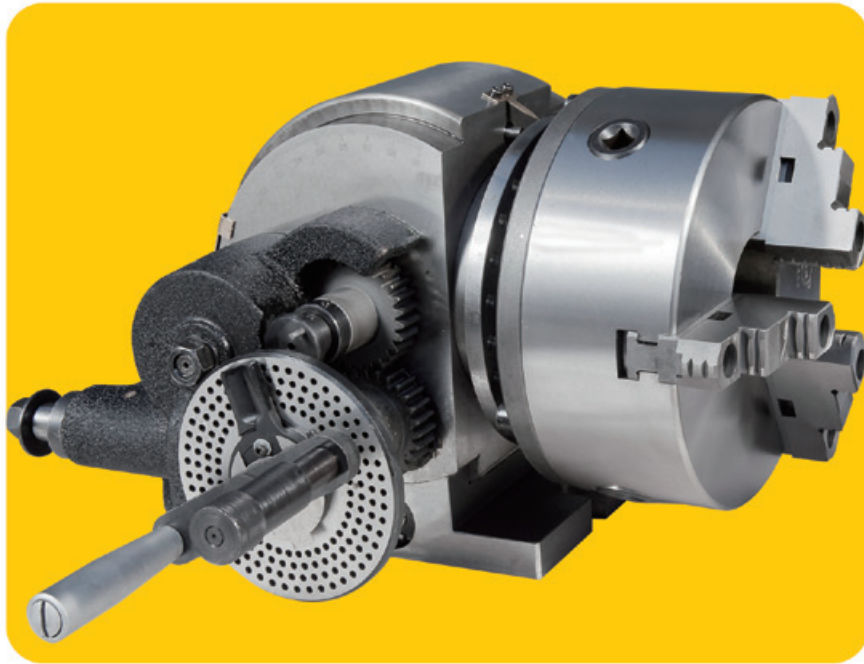
Semi-Universal Index B&S Type
No.0 No.1 (Head-stock)

Unit: mm/inches

MODEL	A	B	H	h	a	b	g	Taper of center	Diameter of spindle hole
BS-0	193 7.59	131 5.15	173 6.81	100 3.93	166 6.53	90 3.54	16 0.63	B&S No.7	18 0.71
BS-1	242 9.52	168 6.61	220 8.66	128 5.04	208 8.11	113 4.45	16 0.63	B&S No.9	20 0.79

Unit: mm/inches

MODEL	A1	B1	H1	h	a1	b1	g1
BS-0	175 6.89	87 3.42	102 4.02	100 3.93	130 5.12	92 3.62	16 0.63
BS-1	183 7.20	87 3.42	137 5.39	128 5.04	168 6.22	110 4.33	16 0.63



These heads are suitable for milling grinding and drilling work. A plain dividing plate with 24 notches gives direct divisions of 2, 3, 4, 6, 8, 12 and 24. By indirect indexing (worm gear ratio 1:40) all divisions up to 50 and many above 50 can be carried out (see indexing chart). Divisions beyond the indirect indexing range are obtained by using the differential system which gives all divisions up to 1000. The indexing chart supplied with each head lists all divisions up to 380. Spiral milling work can also be carried out with BS-2 dividing heads.

Construction: These attachments combine rigidity with accuracy. The indexing spindle runs in precision taper roller bearings virtually free of play. In contrast to conventional designs the direct indexing plate is mounted at the tapered front indexing spindle. Dividing head and indexing spindle can be swivelled from horizontal to vertical. Indexing spindle, worm, direct indexing pin are hardened and ground, as well as centerers and indirect indexing pin. The wormwheel is made of a special hard phosphor-bronze. Worm and wormwheel as well as most of the other revolving parts rotate in oil.

Semi-Universal Dividing Head

ENCLOSURE:

1. Fixed tailstock
2. Carrier
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4. Direct indexing plate with 24 notches
5. Indirect indexing plate with 18 circles of holes 15-49
A 15,16,17,18,19,20
B 21,23,27,29,31,33
C 37,39,41,43,47,49
6. 12 change gears for differential and spiral milling.(only BS-2)
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9. Test certificate
10. Operating instructions
11. Indirect dividing table
12. Differential dividing table (only fitting BS-2)
13. Table for spiral milling (only fitting BS-2)

THREAD SPINDLE:BS-0 1-1/2" -8TPI
BS-1 1-1/2" -8TPI

Standard Accessories:



Universal Index B&S Type
No.2 (Head)-stock)

Unit:mm/inches

MODEL	A	B	H	h	a	b	g	Taper of center	Diameter of spindle hole
BS-0	193 7.59	280 11.02	236 9.29	133 5.23	212 8.35	134 5.27	16 0.63	B&S No.10	25.4 1

Unit:mm/inches

MODEL	A1	B	H1	h	a1	b1	g1
BS-0	183 7.20	87 3.42	156 6.14	133 5.24	175 6.89	122 4.80	16 0.63



FEATURES:

The BS-3 is designed and made according to characteristics and advantages to all kinds of dividing heads, suitable for general dividing, gear and rack spindle cutting, in many use.

Designed for super hole 55.5mm of diameter shaft hole. Slope of end hole is Morse's taper No.6 and the BS-3 can be adjusted from being level of vertical ($0^\circ \sim 90^\circ$).

All the BS-3's shaft, spindle center, worm and gear are made of super steels through grinding, heat treatment, to achieve rigid construction.

Its tailstock designed in dovetail joint, very strong in structure which is available for heavy-duty load, also the degree can be adjusted in every direction.

The ratio of worm and worm gear is 1:40.

The Dividing plate is available in two sides, A and B. A Face

24.25.28.30.34.37.39.41.42.43. B Face

46.47.49.51.53.54.57.58.59.62.66

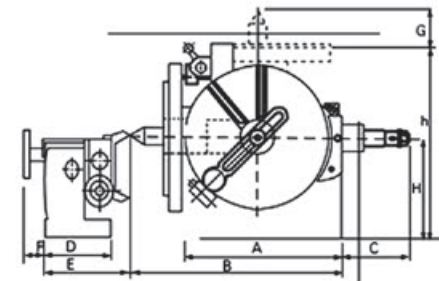
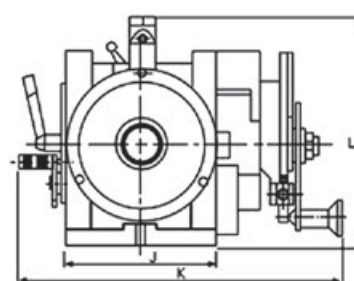
The changeable gears are 24, 28, 32, 38, 40, 44, 48, 56, 64, 72, 86 and 100

Standard accessories are: Center, Carrier, Gear Bracket, Gear Set.

Center Height of Tail Stock

Max. 165mm

Min. 38mm



MODEL	A		B		C		D		E		F		G	
BS-3	245	9 21/23	322	12 11/16	152	6	166	6 17/32	198	7 25/32	50	11 5/16	52	2 1/16
MODEL	H		h		J		K		L		重量(kg)			
BS-3	143	5 5/8	278	10 15/16	194	7 5/8	465	18 5/16	290	11 13/32	132			

Adjustment of worm backlash

Any backlash between worm and worm wheel encountered after extensive operation is removed as follows:

1. Loosen locking bolt and turn the stop screw so far until worm backlash has been taken out. In this respect however, a free turning of the hand crank should still be possible.

2. Tighten locking bolt.

The worm backlash has been removed when no more play can be observed on the index head spindle.



Direct indexing

Swivel out the worm. For further indexing, loosen the spindle locking and lift out the direct dividing index with the respective lever. The indexing spindle can then be turned by the desired number of holes, after which the direct dividing index is engaged again. In the case of relatively heavy work, tighten the spindle locking as well. The standard equipment includes holes. Plate with 24 holes.

Rule: Divide 24 by the number of divisions required and the result equals the number of holes to move in the 24-hole rapid index plate. Thus, number of holes to move = $24/D$, where D is the number of divisions.



Indirect indexing

In this case swivel the worm carefully to the stop by means of the swivel lever, at the same time turning slightly the indexing spindle and then the hand crank. Disengage the direct dividing index. Operate clamping device for hole plate. Then take the following steps:

1. Look up circle of holes in the indexing table. If the particular circle of holes is not visible on the index plate, remove hand crank and indicator bracket, remove index plate after loosening of holding screws and screw it on again in reversed form. (The circles of holes stated are distributed over both sides of the index plate).

2. Adjust indicator bracket after loosening of locking screw in such a way that the number of holes which is also shown in the table remains uncovered between the legs.

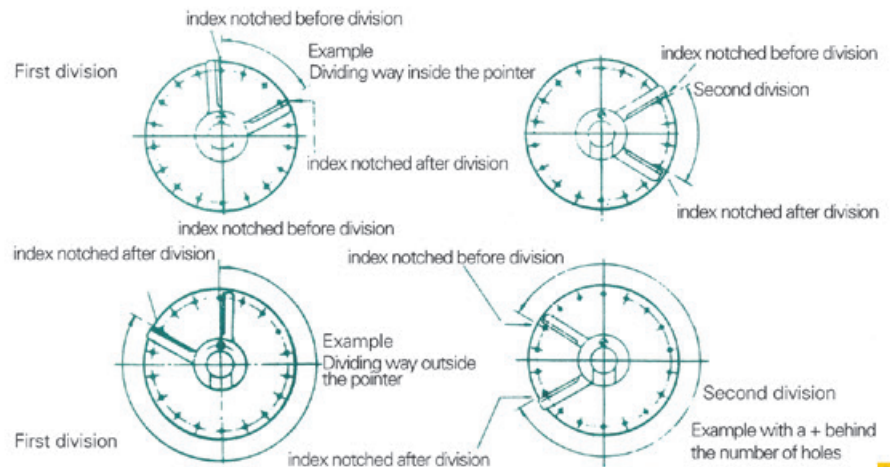
3. Tighten locking screw. 4. After loosening of central nut shift hand crank in such a way that the index pin can engage in a hole of the desired circle of holes. Do not disalign hand crank! After tightening the central nut, it must be possible to engage the index of the hand crank in every desired hole of the circle.

5. Then engage the index of the hand crank in the starting position and turn the indicator bracket in indexing direction until the index lies flush to the inside of the second indicator leg. (Note: If a + is shown behind the number of holes in the table, move the indicator bracket in the direction opposite to indexing until it contacts the index).

6. For further division disengage the index, turn the hand crank until the index can engage in the last hole before the second indicator leg.

7. If, by accident, the index has passed over the intended hole, the handle has to be turned back for several holes in order to engage the index in the right holes in handle again in clockwise direction.

8. Clamp the indexing spindle for heavy work.



Example: Divisions $D = 9$. Then $T = 40/9$, or 4 turns plus $4/9$ turn. Multiply the fraction by a suitable number, say 2. Then $4/9$ becomes $8/18$. Since you have an 18-hole circle, you will index 4 turns plus 8 spaces on the 18-hole circle.

Angular Indexing.

Because the dividing head is geared in a 40:1 ratio, one turn of the crank indexes the spindle $360/40 = 9^\circ$. If the angular distance is in degrees only $= \alpha/9$, where α is expressed in degrees.

Example: To be milled $43^\circ 20'$ apart,

$$T = \frac{\alpha}{90} \rightarrow \frac{43^\circ 20'}{90} = \frac{2600'}{540'} = 4 \frac{22}{27}$$

We might index 4 turns plus 22 holes on the 27-hole plate.

Differential indexing

This process is employed for all index numbers which cannot be obtained by indirect indexing in this case Clamp the differential bolt into the rear end of the indexing spindle and loosen the locking pin for the index plate.

Then attach the change gears as per indexing table on the bracket or the differential bolt and engage them with a minimum of slack. Then carry out indexing.



Milling spiral flutes

A twisted flute generally found on twist drills, reamers, screw taps, screw wheels, worms etc. may be always performed by an universal or special dividing attachment if the milling machine used for this purpose is provided with a swivelling table or a swivelling milling spindle head. The spiral is produced by two coincident movements: a straight-lined advancing movement by the milling table and a revolving movement of the workpiece caused by the table leadscrew through change gears gear spindle; worm spindle to the dividing head spindle. These motions are to bear a determined constant and uniform mutual proportion.

The change gear ratio must be selected in such a manner that the course made by the rotation of the table leadscrew is equal to the lead "S" required on the workpiece. Moreover, the milling table is to be swivelled its zero position to the inclined position corresponding to the spiral lead. The result is a constant perpendicular position of the cutter axis to the lead of the spiral produced.

As long as the milling table still reverts in the zero position the cutter should be dressed exactly over the longitudinal axis of the workpiece.

Then, the milling table is to be swivelled until the longitudinal axis of the table and the cutter axis are forming the lead angle that will then agree with the spiral desired.

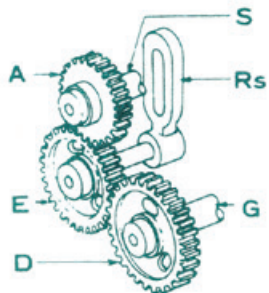
The direction of rotation of the desired spiral (lefthand or righthand spiral) determines the swivelling direction of the milling table which is to be swivelled in such a way that the workpiece during its rotating and forward movement is always moving towards the cutter.



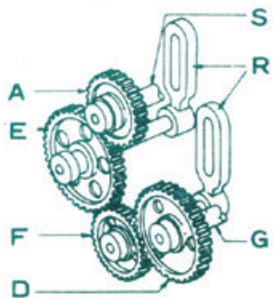
APPLICATION OF CHANGE GEARS

REMARKS:

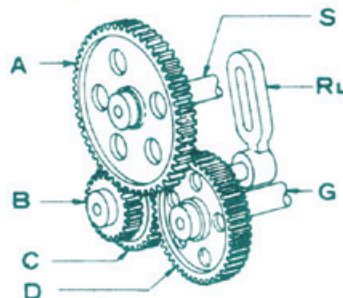
A: gear to be hanged on spindle arbor
 B: moving wheel(I)
 C: moving wheel(II)
 D: gear rotation of gear case arbor
 E: gear (I) to be hanged on bracket
 F: gear (II) to be hanged on bracket
 G: gear case arbor
 H: holes of dividing plate
 N: rotation of crank handle
 RLRS: bracket
 S: spindle arbor



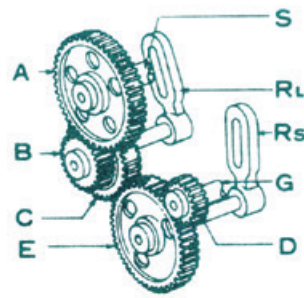
FIG(A)



FIG(B)



FIG(C)



FIG(D)

NOTICE

Take worm in mesh; loose indirect dividing plate; engage indirect dividing index; disengage direct indexing pin.

Rule of division: The change gear ratio "i" required for the desired flute and the setting angle "β" of the milling table are obtained as follow:

$$i = \frac{s \times k}{s} \quad \frac{(\text{driving wheels})}{(\text{driving wheels})} \quad \text{tang } \beta = \frac{d \times \pi}{s}$$

s=lead of spingle for table

k=transmission ratio in the indexing attachment, mostly 40:1

s=lead of the desired spiral

i=transmission ratio of change gears

d=diameter of workpiece

β =setting angle of milling table

Angle β is found in the Table of Tangens at the corresponding value of tang β

Example: How to mill a twist flute

Given: k=40:1
 S=12"
 d=4"
 s=1/4"

Wanted: a) Setting angle of milling table
 b) Change gears required

$$\text{Solution: a) } \text{tang } \beta = \frac{d \times \pi}{s} = \frac{4 \times \pi}{12} = 1.048$$

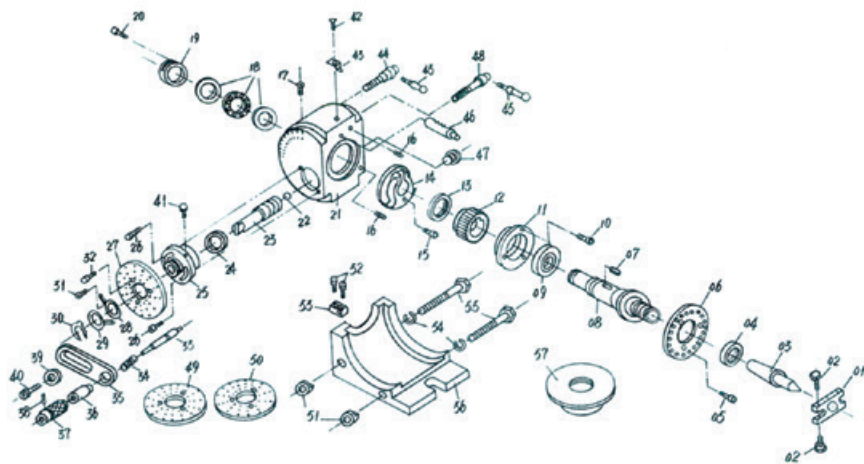
according to Table of Tangers: angle β = 6°

$$\text{b) } i = \frac{s \times k}{s} = \frac{1 \times 40}{4 \times 12} = \frac{40 (\text{driven wheels})}{48 (\text{driving wheels})}$$

Spiral surfaces surfaces (Archimedean spirals) on principle are milled in the same way as spiral flutes, the spindle of dividing head being driven by table leadscrew by means of change-wheels and gearing spindle. cutter spindle and dividing head spindle must be set perpendicularly to each other or in a suitable angle respectively.

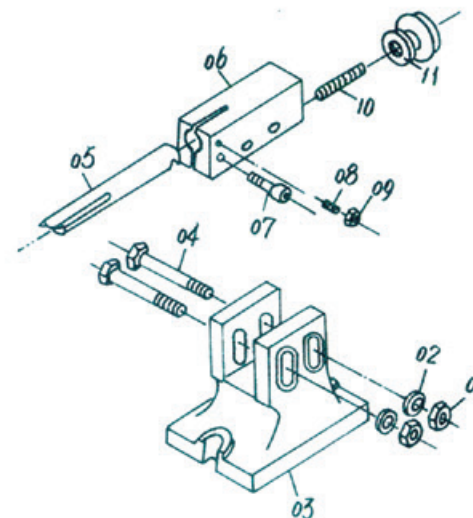
Semi-Universal Dividing Head

EXPLODED VIEW BS-0,BS-1



PARTS LIST For BS-0,BS-1

Part No.	Description	Qty	Part No.	Description	Qty
P01	Carrier	1	P20	Cross recessed countersunk head screw	1
P02	Hex. head bolt	5	P21	Main body	1
P03	Center	1	P22	Steel ball	1
P04	Round nut	1	P23	Worm shaft	1
P05	Hex.socket cap screw	3	P24	Ring	1
P06	Direct indexing plate with 24 notches	1	P25	Sleeve	1
P07	Guide block	1	P26	Hex.socket cap screw	2
P08	Line shaft	1	P27	Indirect indexing plate with 6 circles of hole 15-20	1
P09	Bearing	1	P28	Left index	1
P10	Hex.socket cap screw	3	P29	Right index	1
P11	Bearing base	1	P30	Plate	1
P12	Helical gear	1	P31	Cross recessed pan head screw	1
P13	Round nut	1	P32	Cross recessed pan head screw	3
P14	Lock sleeve	1	P33	Limit shaft	1
P15	Hex socket cap screw	1	P34	Spring	1
P16	Set screw	2	P35	Control plate	1
P17	Oil cap	1	P36	Pin	1
P18	Bearing thrust collar	1	P37	Knurled handle	1
P19	Slotted round nut	1	P38	Taper pin	1

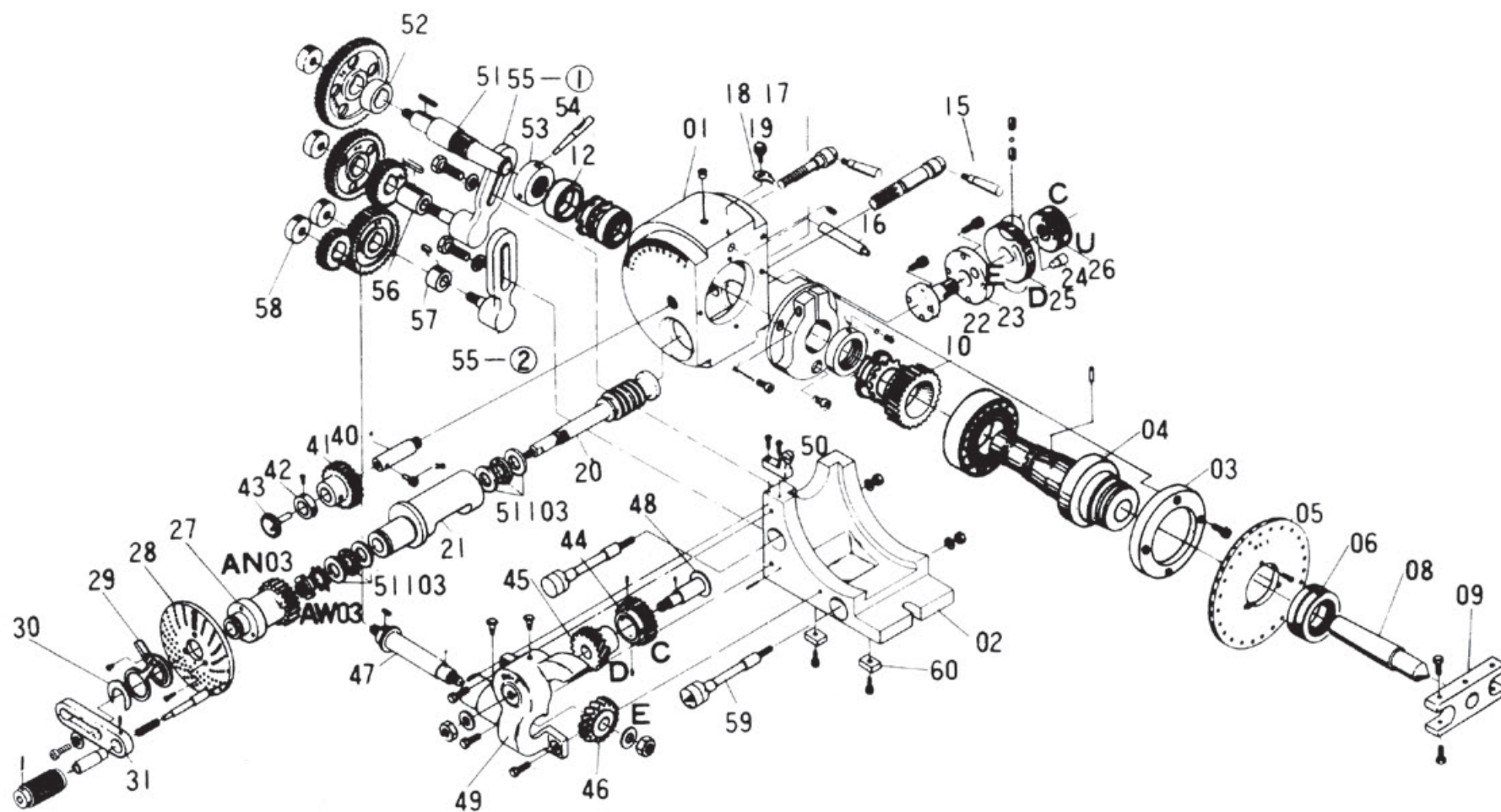


Tail Stock

Part No.	Description	Qty	Part No.	Description	Qty
P39	Shaft washer	1	TP01	Nut	2
P40	Screw	1	TP02	Washer	2
P41	Oil cap	1	TP03	Fixed tailstock (Base)	1
P42	Cross recessed pan head screw	1	TP04	Hex. head screw	2
P43	Limit plate	1	TP05	Center for tailstock	1
P44	Lock handle	1	TP06	Moveable block	1
P45	Handle	2	TP07	Hex. socket cap screw	1
P46	Rock	1	TP08	Set screw	1
P47	Limit bolt	1	TP09	Nut	1
P48	Gear shaft	1	TP10	Stud	1
P49	Indirect indexing plate with 6 circles of holes 21-33	1	TP11	Control nut	1
P50	Indirect indexing plate with 6 circles of holes 37-49	2			
P51	Back nut	2			
P52	Hex.socket cap screw	1			
P53	Block	1			
P54	Single coil spring lock washer	2			
P55	Hex. head bolt	2			
P56	Dividing head base	1			
P57	Flange plate	1			

Universal Dividing Head

EXPLODED VIEW BS-2



DIVIDING TABLE(WORM RATIO 1:40)

T	1	2	3	4	5	6	7	8	9	10	11	12
H		※	33	※	※	33	49	※	18	※	33	33
N		20	13 11/13	10	8	6 22/33	5 35/49	5	4 8/18	4	3 21/33	3 11/33
T	26	27	28	29	30	31	32	33	34	35	36	37
H	39	27	49	29	33	31	20	33	17	49	18	37
N	1 21/39	1 13/27	1 21/49	1 11/29	1 11/33	1 9/31	1 5/20	1 7/33	1 3/17	1 7/49	1 2/18	1 3/37

T	13	14	15	16	17	18	19	20	21	22	23	24	25
H	39	49	33	20	20	18	19	※	21	23	23	33	20
N	3 11/33	2 42/49	2 22/33	2 10/20	2 10/20	2 4/18	2 2/19	2 2/19	1 19/21	1 27/33	1 17/23	1 33/22	1 12/20
T	38	39	40	41	42	43	44	45	46	47	48	49	50
H	19	39	※	41	21	43	33	18	23	47	18	49	20
N	1 1/19	1 1/39	1	40	20/21	40/43	30/33	16/18	20/23	40/47	15/18	40/49	16/20

T	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
H	33	39	33	27	33	49	33	29	33	33	16	31	16	16	39	33	49	49	49	49
N	24/33	30/39	24/33	20/27	24/33	35/49	22/33	20/29	22/33	22/33	10/16	20/31	20/31	10/16	24/39	20/33	28/49	10/17	28/49	28/49
A	64	64				48		32		72		40					48		32	
B	44	44				24		48		48		32					28		56	
C	48										40	24								
D	24									32	48									
E		28				40		40									32		40	

T	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
H	15	18	15	37	15	19	20	39	20	20	21	41	21	21	17	43	33	33	18	18
N	8/15	10/18	8/15	20/37	8/15	10/19	10/20	20/39	10/20	10/20	10/21	20/41	10/21	10/21	8/17	20/43	15/33	15/33	8/18	8/18
A	64		64				48		24		40						24		24	
B	24		40				32		48		28		32				44		72	
C	32		32										48				40		64	
D	40		48										40				48		48	
E							40		44		44		56							

T	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110
H	20	23	20	47	19	20	20	49	20	20	33	33	33	39	21	33	33	27	33	33
N	8/20	8/20	8/20	20/47	8/19	8/20	8/20	20/49	8/20	8/20	12/33	12/33	12/33	15/39	8/21	12/33	12/33	10/27	12/33	12/33
A	72		56			64	48		24		72	64	56			64	68		24	
B	40		40			40	40		40		44	44	44			44	44		44	
C	48		48						32		48	48	48						32	
D	24		24						48		24	24	24						48	
E						32										28	32			

T	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
H	33	33	33	33	33	29	33	33	33	33	33	16	33	31	33	16	16	16	33	39
N	12/33	11/33	11/33	11/33	8/33	10/29	11/33	11/33	11/33	11/33	10/33	5/16	10/33	10/31	10/31	5/16	5/16	5/16	10/33	12/39
A	72	64	56	48			24	32	28		48	72	72		40	40	24		40	
B	24	24	24	24			24	48	48		24	48	44		44	32	64		44	
C									32		40	40	40		56	24	40			
D									56		24	32	24		24	48	48			
E	28	32	32	40				40											32	

DIVIDING TABLE (1:40)

T	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
H	49	33	49	49	27	17	49	49	49	49	18	15	15	18	18	15	15	37	20	15
N	14/49	10/33	14/49	14/49	8/27	5/17	14/49	14/49	14/49	14/49	5/18	4/15	4/15	5/18	5/18	4/15	4/15	10/37	5/20	4/15
A	56		48	48			24	32	24			64	56			56	32	32	48	
B	72		24	28			28	56	48			24	24			24	40		32	
C	24								32			32	32			32			44	
D								56				40	40			40			24	
E			44	44			56	44								44				
F																				

T	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170
H	20	19	20	20	31	39	20	20	20	20	21	21	33	41	33	21	21	21	18	17
N	5/20	5/19	5/20	5/20	8/31	10/39	5/20	5/20	5/20	5/20	5/21	5/21	8/33	10/41	8/33	5/21	5/21	5/21	4/18	4/17
A	72		56	48			24	24	24		40	40	32			40	24		65	
B	32		32	32			32	48	48		24	28	72			56	72		48	
C									32				48			32	40		44	
D									56				44			48	56		24	
E	28		40	40			48	44			44	32								
F																				

T	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190
H	18	43	18	18	18	20	18	18	20	18	20	20	21	23	37	20	49	47	20	19
N	4/18	10/43	4/18	4/18	4/18	4/20	4/18	4/18	4/20	4/18	5/20	4/20	4/21	5/23	8/37	4/20	10/49	10/47	4/20	4/19
A	48		32	64	40	72	32	24	72		72	72	72			56	40		48	
B	24		48	48	24	40	48	72	40		24	40	28			40	56		40	
C			56		32	64		64	56		56	48	48			48	72		44	
D			24		48	24		48	24		32	24	24			24	28		24	
E	40			32			40				40									
F																				

T	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210
H	20	20	20	20	39	49	20	20	21	20	21	21	21	21	41	21	21	33	33	21
N	4/20	4/20	4/20	4/20	8/39	10/49	4/20	4/20	4/21	4/20	4/24	4/21	4/21	4/21	8/41	4/21	4/21	6/33	6/33	4/21
A	72	64	56	48			24	24	44		48	64	64	32		32	32	56	48	
B	40	40	40	40			40	40	28		28	28	48	28		56	56	44	24	
C								32	32			32				64		48		
D								48	24			48				48		28		
E	32	32	32	44			48				32		32				40		40	
F																				

T	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
H	33	33	33	33	43	27	33	33	18	33	39	21	33	18	18	18	49	18	18	23
N	6/33	6/33	6/33	6/33	8/43	5/27	6/33	6/33	3/18	6/33	6/39	4/21	6/33	3/18	3/18	3/18	8/49	3/18	3/18	4/23
A	72	32	56	48			24	24	72		72	72	24	64	48	56	72	56	44	
B	24	44	44	44			44	44	24		24	24	44	24	32	24	28	28	24	
C	24	48						32	28		48				40		64			
D	44	24						48	24		24				24		56			
E			32	32			40					32	64	32		40		40	48	
F													32							

T	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250
H	18	29	18	18	47	18	18	18	49	18	33	49	27	49	49	27	39	31	27	33
N	3/18	5/29	3/18	3/18	8/47	3/18	3/18	3/18	8/49	3/18	6/33	8/49	4/27	7/49	8/49	4/27	6/39	5/31	4/27	5/33
A	48		56	24		32	24	28	32		56	32	56	72		64	56		56	56
B	32		48	24		48	48	48	56		44	28	28	28		24	28		24	44
C								32	48		72	24	48	48		32			32	40
D								56	28		24	56	24	24		24			24	24
E	40		32	48		44	44				40									
F																				

DIVIDING TABLE (1:40)

T	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270
H	18	33	33	18	27	49	33	33	49	39	27	49	27	33	49	49	27	49	49	27
N	3/18	5/33	5/33	3/18	4/27	7/49	5/33	5/33	7/49	6/39	4/27	7/49	4/27	5/33	7/49	7/49	4/27	7/49	7/49	4/27
A	44		40	56	40	64	56	40	72		64	72	56		40	64	32	48	44	
B	24		24	24	48	32	48	44	24		48	28	24		56	32	72	28	28	
C					64	48	40						32		72					
D					24	28	44						72		24					
E	48		44	28				32	32		32	32				40	44	44	40	
F	40			48																

T	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310
H	15	15	15	15	15	37	33	16	146	15	43	16	33	16	16	16	15	16	16	31
N	2/15	2/15	2/15	2/15	2/15	5/37	4/33	2/16	2/16	2/15	5/43	2/16	4/33	2/16	2/16	2/16	2/15	2/16	2/16	4/31
A	48	64	56	32	32		56	48	56		72	72	72	56	40	56	56	48	44	
B	40	40	40	40	48		28	32	64		24	32	44	28	64	32	40	32	32	
C		32	32				48	44	72		40		48		72		48			
D		48	48				24	24	24		24		24		24		72			
E	44			44	44							28		40		40	24	40	40	
F																				

T	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350
H	16	18	18	16	33	18	43	18	18	17	33	18	49	43	18	18	49	18	18	18
N	2/16	2/18	2/18	2/16	4/33	2/18	5/43	2/18	2/18	2/17	4/33	2/18	5/49	5/43	2/18	2/18	5/49	2/18	2/18	2/18
A	44	56	72	56	48	64	56	64	64		32	56	72		40	32	72	64	32	40
B	64	24	24	32	44	24	32	48	48		24	28	24		24	48	56	48	48	24
C	48	32			40		40	44	44				40			56	100		44	32
D	24	24			72		86	24	24				24			24	28		24	48
E	40		32	48	24	40					56	32			44			32		
F				40							40									

T	371	372	373	374	375	376	377	378	379	380
H	49	20	20	49	20	47	39	20	19	19
N	5/49	2/20	2/20	5/49	2/20	5/47	4/39	2/20	2/19	2/19
A	40	56	72	40	48		64	48		
B	56	40	40	56	32		48	40		
C	72	48	48	72	40			44		
D	24	24	32	28	24			24		
E							32			
F										

T	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290
H	49	49	49	49	49	49	49	49	15	49	27	15	49	15	15	15	16	15	15	29
N	7/49	7/49	7/49	7/49	7/49	7/49	7/49	7/49	2/15	7/49	4/27	2/15	7/49	2/15	2/15	2/15	2/16	2/15	2/15	4/29
A	72	64	24	48	40	32	24	32	56		44	56	32	64	56	56	72	64	44	
B	24	24	24	56	56	56	56	48	40		72	40	64	24	28	24	24	40	24	
C	24	24						24	48		64	48	48	32		32	44		32	
D	56	56						56	24		24	28	56	40		40	32		40	
E			56	40	44	44	44				40		40		40			44		
F																				

T	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330
H	16	39	16	16	16	16	16	16	33	16	33	33	33	33	33	33	33	41	47	33
N	2/16	5/39	2/16	2/16	2/16	2/16	2/16	2/16	4/33	2/16	4/33	4/33	4/33	4/33	4/33	4/33	4/33	5/41	5/47	4/33
A	72		28	24	40	28	24	24	64		48	64	64	32	40	32	24		72	
B	24		32	32	32	56	32	48	48		44	44	44	44	44		44		24	
C	24				24		28	28				32	28		32		32		40	
D	64				48		56	56				48	48		48		48		24	
E			48	48		40			32		40			40						
F																				

T	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370
H	18	18	18	18	18	18	18	20	43	18	19	43	33	49	20	21	20	20	40	37
N	2/18	2/18	2/18	2/18	2/18	2/18	2/18	2/20	5/43	2/18	2/19	5/43	3/33	5/49	2/20	2/21	2/20	2/20	4/41	4/37
A	24	64	32	32	40	24	28	72	48		56	72	72	48	56	72	72	64	56	
B	24	24	24	48	72	72	48	40	86		28	86	24	28	32	28	24	40	24	
C		24	28			64	32	56	100			100	56	40	48	48	44	56	48	
D		72	48			48	56	24	32			40	24	24	24	24	40	28	28	
E	48			44	28				28			28								
F																				