

 **MST**
ANGLE HEADS



- **MODULAR SERIES**
- **MODULAR NSK MINI SERIES**
- **SOLID SERIES**
- **FLANGE SERIES**
- **HALF SERIES**
- **HALF UNIVERSAL SERIES**
- **HALF MINI SERIES**



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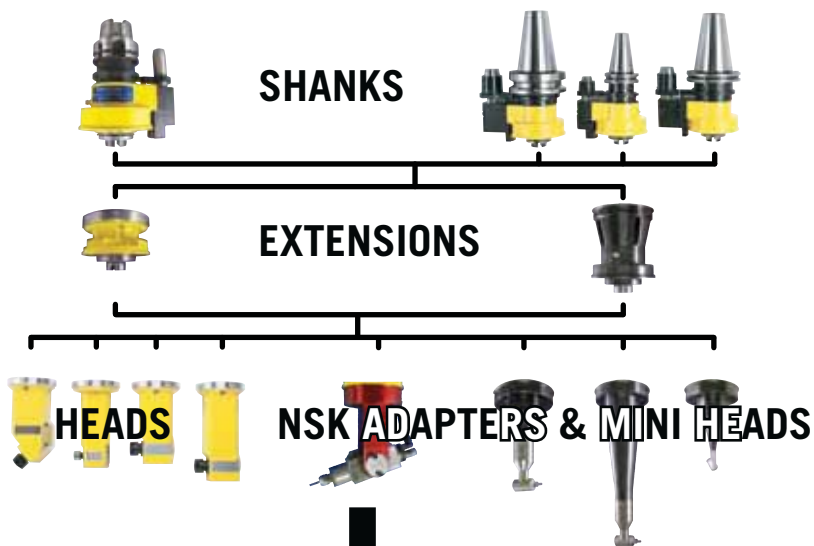
email: info@artcotools.com website: www.artcotools.com

MST ANGLE HEADS - MODULAR SERIES

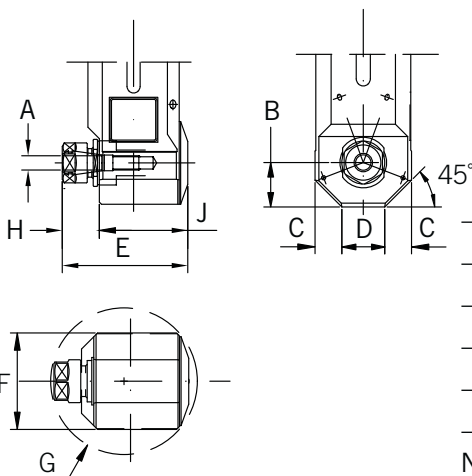
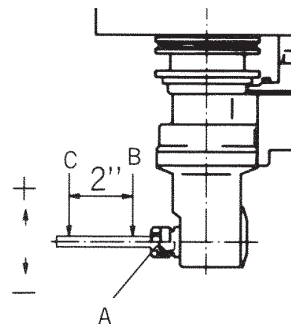
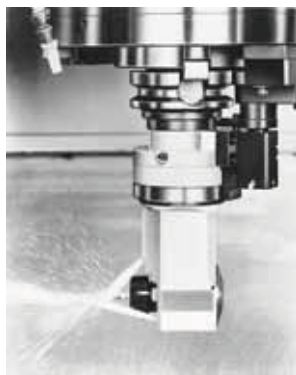


See p55, Cat #211-1 for Horsepower & Torque Charts.

Recommended Grease: Mobilux EP1
Shell Alvania EP1



- A WIDE VARIETY OF SHANKS, ANGLE HEADS, AND ACCESSORIES
- MECHANICALLY DRIVEN MINI SERIES WITH NSK ANGLE HEADS.
- HARDENED PRECISION SPIRAL BEVEL GEARS FOR OPTIMUM RIGIDITY
- SPLASH COOLANT THRU BODY ON MOST MODELS
- A RUGGED CAST IRON BODY DESIGN
- SUPERIOR PRECISION
- COMPACT DESIGN



Cavity at Bore	A	.0002" TIR
Test Bar at Face	B	.0004" TIR
Test Bar at 2"	C	.0006" TIR
Deviation of Angle (high or low of C under B = 0)	90°	±.0004" TIR

MODEL	COLLET	RANGE A	B	C	D	E	F	øG	H	J
159	#107(ER20)	.039-.511	1.14	.67	1.10	3.78	2.46	4.10	1.34	2.44
162	#103(ER16)	.039-.393	1.14	.67	1.10	3.46	2.46	3.80	1.02	2.44
164	#102(ER11)	.019-.275	.87	.55	1.10	2.84	2.22	2.90	.89	1.95
165	#101(ER08)	.019-.196	.79	.39	1.02	2.24	1.83	2.50	.61	1.63

Note: G dimension is the smallest ID for the head to fit into.

MST ANGLE HEADS - MODULAR SERIES

SHANKS

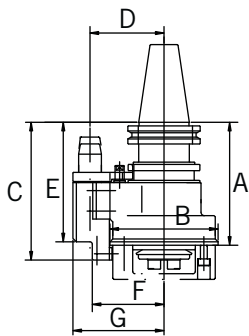


FIG. 1

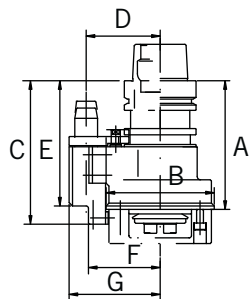


FIG. 2

TAPER	ORDER NO.	A	B	C	D*	E	F	G	FIG.
CAT40	140 SHANK	4.25	3.74	4.76	2.56	4.13	2.48	3.15	1
CAT50	150 SHANK	4.25		4.76	4.33	4.13	2.22	3.93	
BT40	240 SHANK	3.86		4.37	2.56	3.74	2.48	3.15	
HSK63A	063 SHANK	4.45		4.96	2.56	4.33	2.48	3.15	2
HSK100A	100 SHANK	4.45		4.96	4.33	4.33	2.22	3.74	2

Note: * means optional D dimension of 2.36 for CAT40, BT40 & HSK63A is available. The optional D dimension is 3.15 and 3.35 for CAT50 and HSK100A.

Note: Capto & KM shanks are available upon request.

HEADS

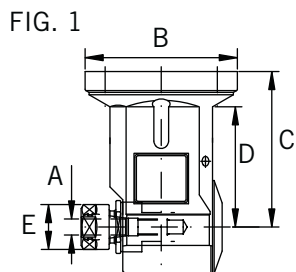


FIG. 1

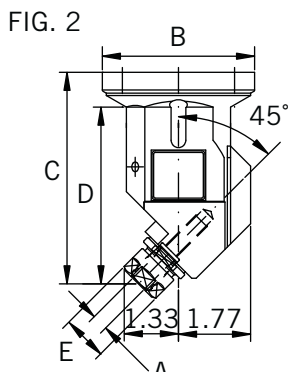


FIG. 2

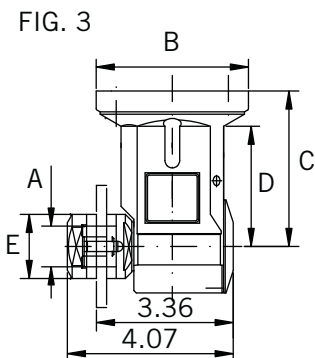


FIG. 3

ORDER NO.	COLLET	A	B	C	D	E	FIG.	
159-3 HEAD	#107 (ER20)	.039-.511	3.74	3.82	2.95	1.34	1	
159-6 HEAD	#107 (ER20)	.039-.511		6.18	5.31	1.34		
162-3 HEAD	#103 (ER16)	.039-.393		3.82	2.95	1.10		
162-6 HEAD	#103 (ER16)	.039-.393		6.18	5.31	1.10		
164-2 HEAD	#102 (ER11)	.019-.275		3.23	2.52	.75		
164-5 HEAD	#102 (ER11)	.019-.275		5.59	4.88	.75		
165-3 HEAD	#101 (ER8)	.019-.196		4.41	3.50	.47		
165-6 HEAD	#101 (ER8)	.019-.196		6.77	5.87	.47		
198-3 HEAD	STUB ARBOR	Ø1.00 PILOT		3.82	2.95	1.57		3
262-4 HEAD	#103 (ER16)	.039-.393		5.20	4.34	1.10		2

EXTENSIONS

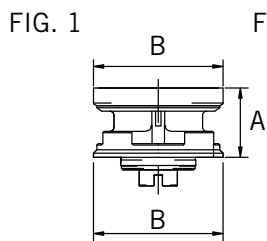


FIG. 1

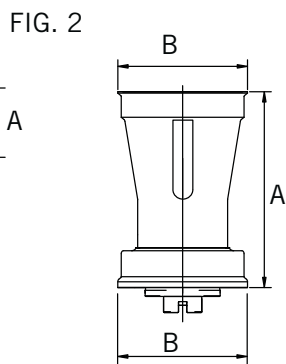


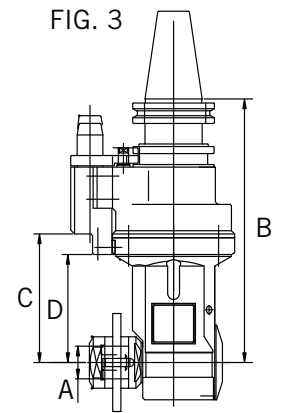
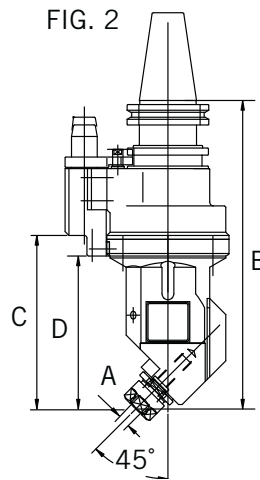
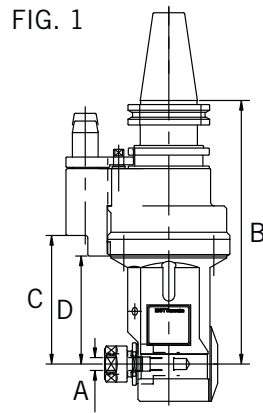
FIG. 2



ORDER NO.	A	B	WT (LB.)	FIG.
159-159-2	2.00	3.74	3.25	1
159-159-4	4.00		7.3	2
159-159-6	6.00		10.3	

Note: Multiple Extensions can be stacked together for additional reach.
Note: No coolant thru body feature available for Extensions.

MST ANGLE HEADS - MODULAR SERIES



CAT & BT FLANGE TOOL SHANKS

TAPER	ORDER NO.	SHANK	HEAD	RANGE A	COLLET	B	C	D	MAX RPM	WT.	FIG.
CAT40	140-159-3	140 SHANK	159-3 HEAD	.039-.511	#107(ER20)	8.07	3.94	3.31	5,000/ *6,000	13.8	1
	140-159-6		159-6 HEAD			10.43	6.30	5.67		17.6	
	140-162-3		162-3 HEAD			.039-.393	#103(ER16)	8.07		3.94	
	140-162-6		162-6 HEAD	10.43	6.30			5.67		17.6	
	140-164-2		164-2 HEAD	.019-.275	#102(ER11)			7.48		3.35	
	140-164-5		164-5 HEAD			9.84	5.71	5.08		14.7	
	140-165-3		165-3 HEAD	.019-.196	#101(ER8)	8.66	4.53	3.90		12.3	
	140-165-6		165-6 HEAD			11.02	6.89	6.26		14.3	
	140-262-4		262-4 HEAD	.039-.393	#103(ER16)	9.45	5.32	4.69		13.8	
CAT50	150-159-3	150 SHANK	159-3 HEAD	.039-.511	#107(ER20)	8.07	3.94	3.31	5,000/ *6,000	19.8	1
	150-159-6		159-6 HEAD			10.43	6.30	5.67		23.6	
	150-162-3		162-3 HEAD			.039-.393	#103(ER16)	8.07		3.94	
	150-162-6		162-6 HEAD	10.43	6.30			5.67		23.6	
	150-164-2		164-2 HEAD	.019-.275	#102(ER11)			7.48		3.35	
	150-164-5		164-5 HEAD			9.84	5.71	5.08		20.7	
	150-165-3		165-3 HEAD	.019-.196	#101(ER8)	8.66	4.53	3.90		18.3	
	150-165-6		165-6 HEAD			11.02	6.89	6.26		20.3	
	150-262-4		262-4 HEAD	.039-.393	#103(ER16)	9.45	5.32	4.69		19.8	
BT40	240-159-3	240 SHANK	159-3 HEAD	.039-.511	#107(ER20)	7.68	3.94	3.31	5,000/ *6,000	13.6	1
	240-159-6		159-6 HEAD			10.04	6.30	5.67		17.4	
	240-162-3		162-3 HEAD			.039-.393	#103(ER16)	7.68		3.94	
	240-162-6		162-6 HEAD	10.04	6.30			5.67		17.4	
	240-164-2		164-2 HEAD	.019-.275	#102(ER11)			7.09		3.35	
	240-164-5		164-5 HEAD			9.45	5.71	5.08		14.5	
	240-165-3		165-3 HEAD	.019-.196	#101(ER8)	8.27	4.53	3.90		12.1	
	240-165-6		165-6 HEAD			10.63	6.89	6.26		14.1	
	240-262-4		262-4 HEAD	.039-.393	#103(ER16)	9.06	5.32	4.69		13.6	
CAT40	140-198-3	140 SHANK	198-3 HEAD	ø1.00 PILOT	STUB ARBOR	8.07	3.94	3.31	5,000	14.5	3
CAT50	150-198-3	150 SHANK				21.8					
BT40	240-198-3	240 SHANK				7.68				14.3	

Note: The Gear Ratio of spindle to angle head is 1:1. The rotating direction of machine spindle to angle axis is CCW: CW.

Note: Purchase ER collets (p128, Cat #211-2) and Common Positioning Block (p16) separately.

Note: * means the max rpm with coolant thru body. The weight (WT) is in lb.

Note: Capto & KM shanks are available upon request.

MST ANGLE HEADS - MODULAR SERIES



FIG. 1

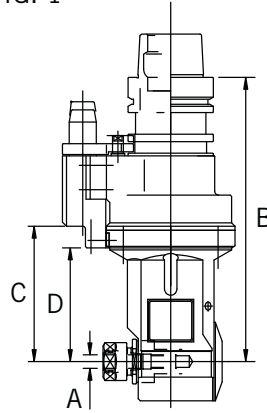


FIG. 2

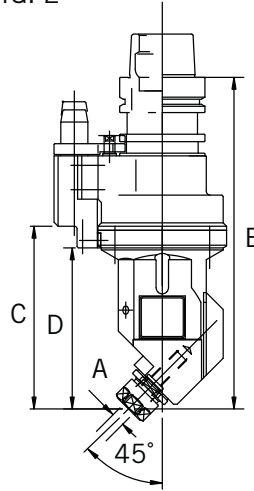
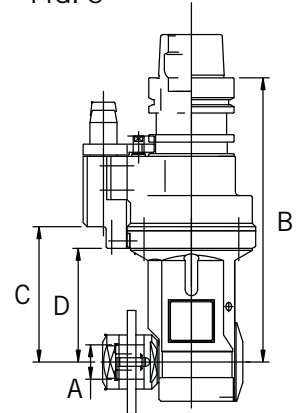


FIG. 3

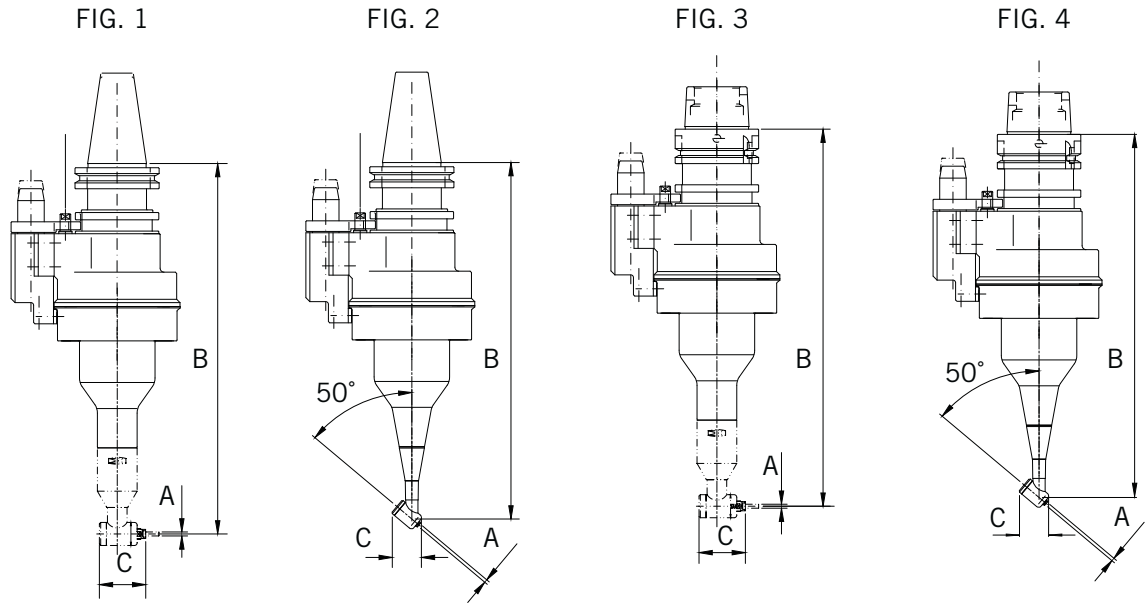


HSK FLANGE TOOL SHANKS

TAPER	ORDER NO.	SHANK	HEAD	RANGE A	COLLET	B	C	D	MAX RPM	WT.	FIG.
A63	063-159-3	063 SHANK	159-3 HEAD	.039-.511	#107(ER20)	8.27	3.94	3.31	5,000/ *6,000	13.7	1
	063-159-6		159-6 HEAD			10.63	6.30	5.67		17.5	
	063-162-3		162-3 HEAD	.039-.393	#103(ER16)	8.27	3.94	3.31		13.1	
	063-162-6		162-6 HEAD			10.63	6.30	5.67		17.5	
	063-164-2		164-2 HEAD	.019-.275	#102(ER11)	7.68	3.35	2.72		11.7	
	063-164-5		164-5 HEAD			10.04	5.71	5.08		14.6	
	063-165-3		165-3 HEAD	.019-.196	#101(ER8)	8.86	4.53	3.90		12.2	
	063-165-6		165-6 HEAD			11.22	6.89	6.26		14.2	
	063-262-4		262-4 HEAD	.039-.393	#103(ER16)	9.65	5.32	4.69		13.7	
A100	100-159-3	100 SHANK	159-3 HEAD	.039-.511	#107(ER20)	8.27	3.94	3.31	5,000/ *6,000	18.5	1
	100-159-6		159-6 HEAD			10.63	6.30	5.67		22.3	
	100-162-3		162-3 HEAD	.039-.393	#103(ER16)	8.27	3.94	3.31		17.9	
	100-162-6		162-6 HEAD			10.63	6.30	5.67		22.3	
	100-164-2		164-2 HEAD	.019-.275	#102(ER11)	7.68	3.35	2.72		16.5	
	100-164-5		164-5 HEAD			10.04	5.71	5.08		19.4	
	100-165-3		165-3 HEAD	.019-.196	#101(ER8)	8.86	4.53	3.90		17.0	
	100-165-6		165-6 HEAD			11.22	6.89	6.26		19.0	
	100-262-4		262-4 HEAD	.039-.393	#103(ER16)	9.65	5.32	4.69		18.5	
A63	063-198-3	063 SHANK	198-3 HEAD	ø1.00 PILOT	STUB ARBOR	8.27	3.94	3.31	5,000	14.4	3
A100	100-198-3	100 SHANK								19.3	

Note: The Gear Ratio of spindle to angle head is 1:1. The rotating direction of machine spindle to angle axis is CCW: CW.
 Note: Purchase ER collets (p128, e-Catalog #211-2) and Common Positioning Block (p16) separately.
 Note: * means the max rpm with coolant thru body. The weight (WT) is in lb.
 Note: Capto & KM shanks are available upon request.

MST ANGLE HEADS - MODULAR NSK MINI SERIES



CAT FLANGE TOOL SHANKS

ORDER NO.		A MAX.	COLLET TYPE	B	C	WT (LB.)*	MAX RPM	FIG.
TAPER	NSK ADAPTER							
140 SHANK	159-NSK-3	1/8	CHS	10.29	1.38	11.2	10,000/ 6,667	1
	159-NSK-5			12.29		11.7		
	159-NSK-7			14.54		14.0		
	159-NSK-3	1/4	CHK	10.96	3.00	11.9		
	159-NSK-5			12.96		12.4		
	159-NSK-7			15.21		14.7		
150 SHANK	159-NSK-3S	1/8	CHS	10.09	1.38	11.1	10,000/ 7,500	1
	159-NSK-5S			12.09		11.6		
	159-NSK-7S			14.34		13.9		
	159-NSK-3SS	IC-300	1/8	CHC	9.22	.86		
KC-300		9.37			.87		2	
MFC-300M		1/16	K-253	10.83	.37	10.7	10,000/ 9,090	1
MFC-300S				10.83				

Note: The rotating direction of machine spindle to angle axis is CW: CW. The max RPM values are for machine spindle/angle axis.

Note: NSK Mini Series are for light milling and drilling applications only.

Note: 1/8" collet furnished with RA-271E, RAX-271E, RA-200, IC-300, & KC-300. 1/16" collet furnished with MFC-300M and MFC-300S.

Note: * means assembly weight with 140 Shank. For 150 Shank, add additional 5.5 lb. to the listed weight above.

Note: Purchase Common Positioning Block (p16), Shank, NSK Adapters, NSK Mini Angle Attachment, and applicable collets separately.

Note: Capto & KM Shanks are available upon request.

MST ANGLE HEADS - MODULAR NSK MINI SERIES

BT FLANGE TOOL SHANKS

ORDER NO.			A MAX.	COLLET TYPE	B	C	WT (LB.)	MAX RPM	FIG.
TAPER	NSK ADAPTER	NSK HEAD							
240 SHANK	159-NSK-3	RA-271E	1/8	CHS	9.90	1.38	11.2	10,000/ 6,667	1
	159-NSK-5				11.90		11.7		
	159-NSK-7				14.15		14.0		
	159-NSK-3	RAX-271E	1/4	CHK	10.57	3.00	11.9		
	159-NSK-5				12.57		12.4		
	159-NSK-7				14.82		14.7		
	159-NSK-3S	RA-200	1/8	CHS	9.70	1.38	11.1		
	159-NSK-5S				11.70		11.6		
	159-NSK-7S				13.95		13.9		
	159-NSK-3SS	IC-300	1/8	CHC	8.83	.86	10.7	10,000/ 7,500	1
KC-300		8.98			.87	2			
MFC-300M		1/16	K-253	10.44	.37	10,000/ 9,090		1	
MFC-300S			K-252	10.44	.55				

HSK FLANGE TOOL SHANKS

ORDER NO.			A MAX.	COLLET TYPE	B	C	WT (LBS)*	MAX RPM	FIG.
TAPER	NSK ADAPTER	NSK HEAD							
063 SHANK	159-NSK-3	RA-271E	1/8	CHS	10.49	1.38	11.2	10,000/ 6,667	3
	159-NSK-5				12.49		11.7		
	159-NSK-7				14.74		14.0		
	159-NSK-3	RAX-271E	1/4	CHK	11.16	3.00	11.9		
	159-NSK-5				13.16		12.4		
	159-NSK-7				15.41		14.7		
100 SHANK	159-NSK-3S	RA-200	1/8	CHS	10.29	1.38	11.1		
	159-NSK-5S				12.29		11.6		
	159-NSK-7S				14.54		13.9		
	159-NSK-3SS	IC-300	1/8	CHC	9.42	.86	10.7	10,000/ 7,500	3
KC-300		9.57			.87	4			
MFC-300M		1/16	K-253	11.03	.37	10,000/ 9,090		3	
MFC-300S			K-252		.55				

Note: The rotating direction of machine spindle to angle axis is CW: CW. The max RPM values are for machine spindle/angle axis.

Note: NSK Mini Series are for light milling and drilling applications only.

Note: 1/8" collet furnished with RA-271E, RAX-271E, RA-200, IC-300, & KC-300. 1/16" collet furnished with MFC-300M and MFC-300S.

Note: * means assembly weight with 063 Shank. For 100 Shank, add additional 5.5 lb. to the listed weight above.

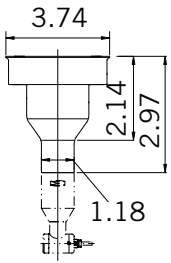
Note: Purchase Common Positioning Block (p16), Shank, NSK Adapters, NSK Mini Angle Attachment, and applicable collets separately.

Note: Capto & KM Shanks are available upon request.

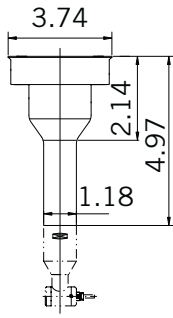
MST ANGLE HEADS - MODULAR NSK MINI SERIES

NSK ADAPTERS (shown with optional NSK Mini Angle Attachments)

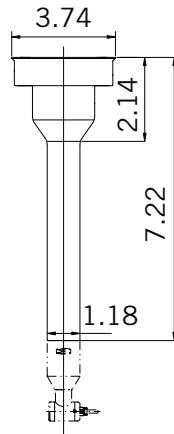
159-NSK-3



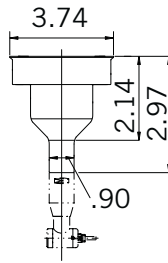
159-NSK-5



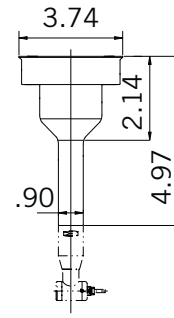
159-NSK-7



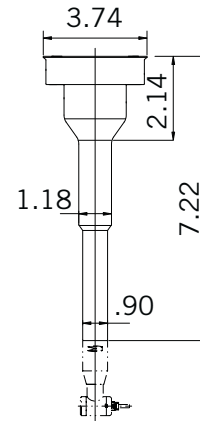
159-NSK-3S



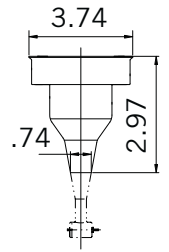
159-NSK-5S



159-NSK-7S

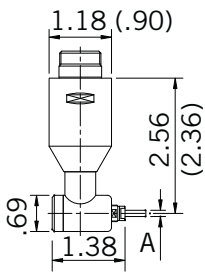


159-NSK-3SS

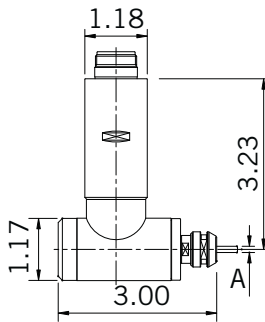


NSK MINI ANGLE ATTACHMENTS

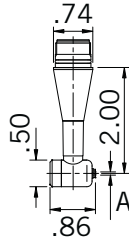
RA-271E
(RA-200)



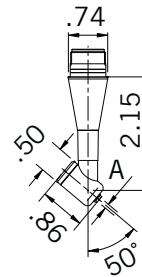
RAX-271E



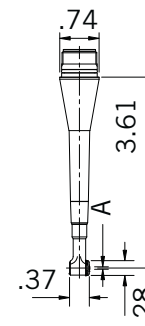
IC-300



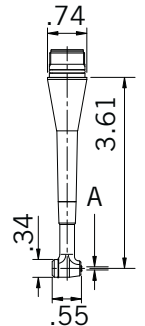
KC-300



MFC-300M



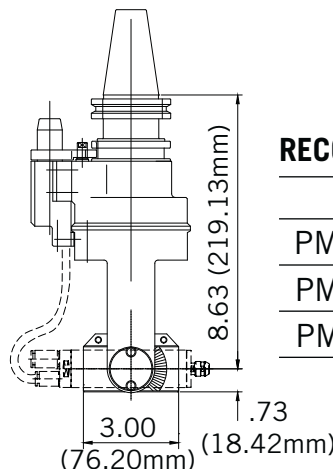
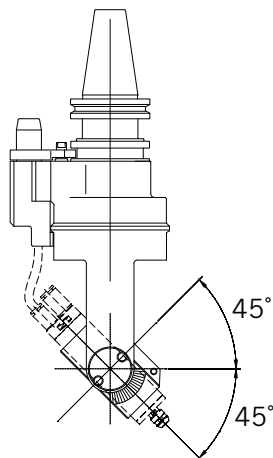
MFC-300S



NSK AIR SPINDLE UNIVERSAL ADAPTER - MODEL NO. 159-NSK-4U



- Variable Cutting Angles with $\pm 45^\circ$ in Z-Direction
- Full ATC Operation - No Manual Tool Change Required
- Ideal for Milling, Drilling, and Grinding
- Available in CAT40, CAT50, BT40, HSK63A, HSK100A, Capto, and KM Configurations



RECOMMENDED NSK AIR SPINDLES

Model	MAX RPM	APPLICATION
PMR-3005K	5,000	Light Milling
PMS-3020K	20,000	Grinding
PMS-3020A	20,000	Light Grinding

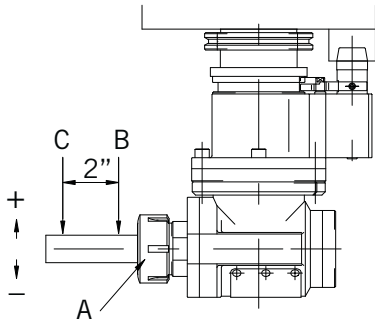
The photo of Model 159-NSK-4U Adapter shown in red. All other components are optional.

Note: Please purchase Shanks (p3) and NSK Air Spindle units separately.

MST ANGLE HEADS - SOLID & FLANGE SERIES

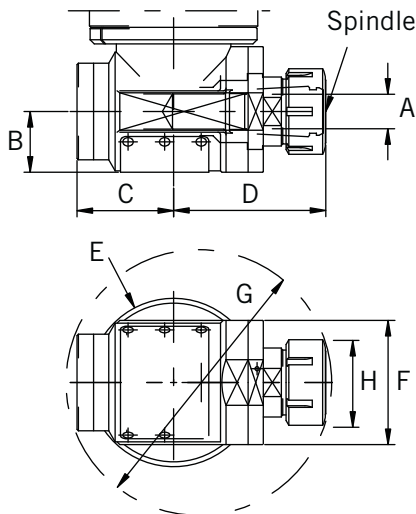


- HARDENED PRECISION SPIRAL BEVEL GEAR FOR OPTIMUM PERFORMANCE
- AVAILABLE IN 3 ANGLE SHAFT CONFIGURATIONS: TG100, ER32 COLLET, AND BT30 MASTER HOLDER TYPE FOR SOLID SERIES
- AVAILABLE IN 4 ANGLE SHAFT CONFIGURATIONS: TG100 COLLET, BT30 MASTER HOLDER TYPE, AND CAT40 MASTER HOLDER TYPE FOR FLANGE SERIES
- THE FLANGE SERIES IS BOLTED DIRECTLY ON THE MACHINE SPINDLE FACE FOR MAXIMUM RIGIDITY
- CUTTING DIRECTION ANYWHERE FROM 0° TO 360°
- SUPERIOR PRECISION



Cavity at Bore	A	.0002" TIR
Test Bar at Face	B	.0004" TIR
Test Bar at 2"	C	.0006" TIR
Deviation of Angle (high or low of C under B = 0)	90°	±.0004" TIR

• COMPACT ANGLE HEAD DESIGN AND RUGGED BODY CONSTRUCTION



MODEL	GEAR RATIO OF SPINDLE : ANGLE AXIS
160	1 : 0.96
161	1 : 0.81
163	1 : 0.96
166	1 : 0.90

MODEL	SPINDLE	A	B	C	D	øE	F	øG	øH
160	TG100 COLLET	.093-1.000	1.73	2.76	4.33	4.80	3.54	7.60	2.50
161	ER32 COLLET	.039-.787	1.57	2.56	3.74	3.86	3.46	6.70	1.97
163	#30 TAPER	BT30	1.73	2.76	4.33	4.80	3.54	7.68	2.60
166	#40 TAPER	CAT40	2.36	4.92	3.94	5.71	4.74	9.86	3.74

Note: The rotating direction of machine spindle to angle axis is CCW: CW

MST ANGLE HEADS - SOLID & FLANGE SERIES

SOLID SERIES

FIG. 1

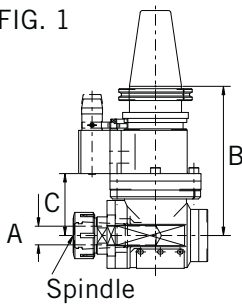


FIG. 2

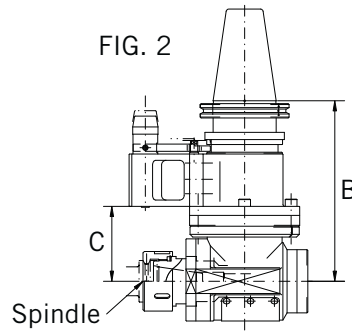
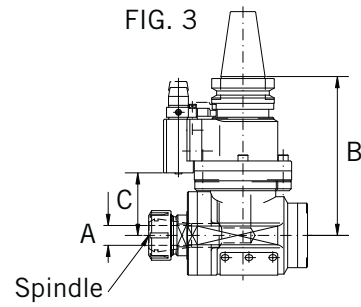


FIG. 3



TAPER	ORDER NO.	RANGE A	SPINDLE	B	C	MAX RPM*	WT (LB.)	FIG.
CAT40	140-161-7	.039-.787	#109(ER32)	6.89	2.48	3,000	16.6	1
CAT50	150-160-8	.093-1.000	#100(TG100)	7.87	3.27	2,500	29.8	
	150-160-10			10.11	5.39		33.5	
	150-163-8	BT30	#30 TAPER	7.87	3.27		32.5	
BT40	240-161-6	.039-.787	#109(ER32)	6.30	2.48	3,000	16.1	3

FLANGE SERIES

FIG. 1

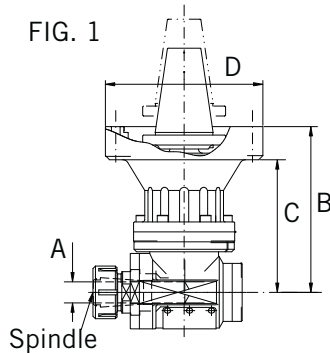


FIG. 2

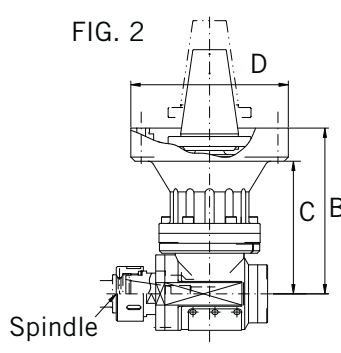
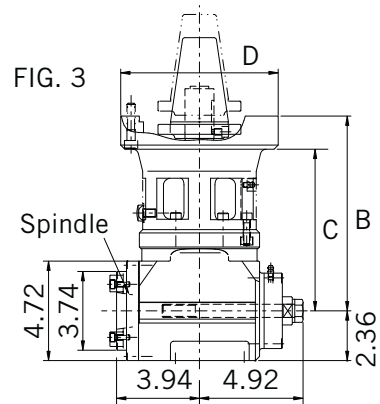


FIG. 3



TAPER	ORDER NO.	RANGE A	SPINDLE	B	C	D	MAX RPM*	WT (LB.)	FIG.
CAT50	350-160-8	.093-1.000	#100(TG100)	7.87	6.30	7.48	2,500	40.7	1
	350-160-14			13.78	12.20			62.9	
	350-163-8	BT30	#30 TAPER	7.87	6.30			43.3	2
	350-163-14			13.78	12.20			65.6	
	350-166-9	CAT40	#40 TAPER	9.25	7.68		2,200	73.0	3

FLANGE SHANK FOR MODULAR HEADS

FIG. 1

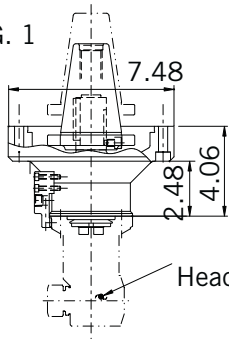
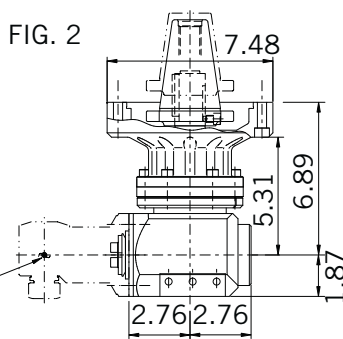


FIG. 2



TAPER	ORDER NO.	MAX RPM*	WT (LB.)	FIG.
CAT40	340 SHANK	6,000	17.0	1
CAT50	350 SHANK	6,000	25.0	
		350 PARALLEL	2,000	42.0

Note: Purchase Modular Heads separately.

Note: Purchase Common Positioning Block (p16) separately for Solid Series.

Note: Purchase ER32 (p129, e-Cat #211-2) or TG100 (p137, e-Cat #211-2) collets separately. Contact Tecnara for a copy of #211-2.

Note: Purchase BT30 and CAT40 Adapters separately. Visit www.tecnaratools.com and refer to e-Cat #211-2 for more info.

Note: Mounting Plate is furnished as a standard accessory. 340 Type comes with F-160 and 350 Type comes with F-190.

Note: Mounting plate must be machined to fit a specific machine.

Note: * means max machine spindle RPM.

Note: Capto & KM Shanks are available upon request for Solid Series only.

MST ANGLE HEADS - HALF SERIES



- **COMPACT AND LIGHT WEIGHT DESIGN**
- **CAST IRON HOUSING FOR MAXIMUM RIGIDITY**
- **IDEAL FOR DRILLING, AND LIGHT MILLING APPLICATIONS**

GEAR RATIO

M/C Spindle to Angle Head = 1 : 1 for Models 152 & 154
 1 : 0.83 for Model 156

ROTATING DIRECTION

M/C Spindle to Angle Axis = CCW: CW

FOR DRILLING & LIGHT MILLING APPLICATIONS

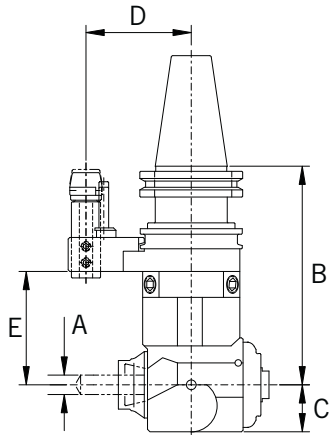


FIG. 1

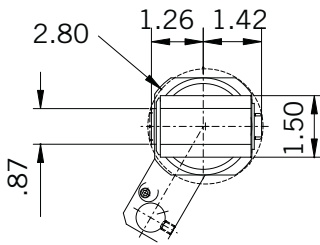


FIG. 2

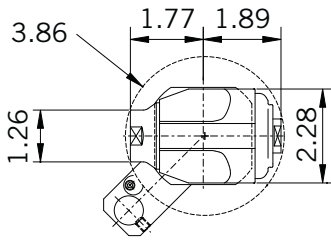
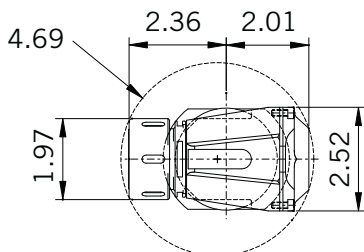


FIG. 3



SHANK	ORDER NO.	RANGE A COLLET	B	C	D	E	MAX RPM*	WT (LB.)	FIG.	
CAT40	140-152-5	.039-.276	5.31	.75	2.56	2.76	6,000	6.8	1	
	140-152-8	#070	7.68			5.12		7.5		
	140-154-5	.098-.512	5.31	1.14		2.76	4,000	8.2	2	
	140-154-8	#120	7.68			5.12		11.0		
	140-156-6	.250-.750	5.91	1.26		3.03	5,000	10.4	3	
	140-156-8	#116	8.27			5.39		12.8		
CAT50	150-152-8	.039-.276	7.68	.75	4.33	5.12	6,000	13.0	1	
	150-152-10	#070	10.04			7.48		13.8		
	150-154-5	.098-.512	5.31	1.14		2.76	4,000	12.8	2	
	150-154-8	#120	7.68			5.12		15.7		
	150-154-10		10.04			7.48	18.5			
	150-156-6	.250-.750	5.91	1.26		3.03	5,000	15.0	3	
150-156-8	#116	8.27	5.39		17.6					
150-156-11		10.63	7.76		20.0					
BT30	230-152-5	.039-.276	4.8	.75	2.56	2.76	6,000	5.1	1	
	230-152-7	#070	7.17			5.12		6.6		
	230-154-5	.098-.512	4.80	1.14		2.76	4,000	6.4	2	
BT40	240-152-5	.039-.276	4.72	.75		2.56	2.76	6,000	6.6	1
	240-152-7	#070	7.09				5.12		7.3	
	240-154-5	.098-.512	4.72	1.14			2.76	4,000	7.9	2
	240-154-7	#120	7.09		5.12		10.8			
240-156-5	.250-.750	5.31	1.26	3.03	5,000		9.9	3		
240-156-8	#116	7.68		5.39			12.3			
HSK 63A	063-152-7	.039-.276	7.21	.75	2.56	5.12	6,000	7.7	1	
	063-152-10	#070	9.57			7.48		8.5		
	063-154-5	.098-.512	4.84	1.14		2.76	4,000	7.3	2	
	063-154-7	#120	7.21			5.12		10.4		
	063-154-10		9.57			7.48	13.2			
	063-156-8	.250-.750	7.8	1.26		5.39	5,000	11.9	3	
063-156-10	#116	10.16	7.76		14.3					

Note: BT30 Half unit is furnished with straight positioning pins. The Common Positioning Block for BT30 Half is HB-01.
 Note: Purchase Common Positioning Block (p16) and applicable collets (p16) separately.
 Note: * means maximum machine spindle RPM.
 Note: Capto & KM Shanks are available upon request.

MST ANGLE HEADS - HALF SERIES



- COMPACT AND LIGHT WEIGHT DESIGN
- CAST IRON HOUSING FOR MAXIMUM RIGIDITY
- EXCLUSIVELY FOR TAPPING APPLICATIONS

GEAR RATIO

M/C Spindle to Angle Head = 1 : 1 for Models 153 & 155
1 : 0.83 for Model 157

ROTATING DIRECTION

M/C Spindle to Angle Axis = CCW: CW

FOR TAPPING APPLICATIONS

SHANK	ORDER NO.	RANGE A TAP SLEEVE	B	C	D	E	MAX RPM*	WT (LB.)	FIG.
CAT40	140-153-5	#4-1/4	5.31	.75	2.56	2.76	6,000	6.8	1
	140-153-8	#153	7.68			5.12		7.5	
	140-155-5	#4-1/2	5.31	1.14		2.76	4,000	8.2	2
	140-155-8	#155	7.68			5.12		11.0	
	140-157-6	#4-5/8	5.91	1.26		3.03	5,000	10.4	3
	140-157-8	#155/#157	8.27			5.39		12.8	
CAT50	150-153-8	#4-1/4	7.68	.75	4.33	5.12	6,000	13.0	1
	150-153-10	#153	10.04			7.48		13.8	
	150-155-5	#4-1/2	5.31	1.14		2.76	4,000	12.8	2
	150-155-8		7.68			5.12		15.7	
	150-155-10	#155	10.04	1.26		7.48	5,000	18.5	3
	150-157-6	#4-5/8	5.91			3.03		15.0	
	150-157-8	#155/#157	8.27			5.39		17.6	
	150-157-11	#155/#157	10.63	1.26		7.76	5,000	20.0	3
230-153-5	#4-1/4	4.8	.75		2.76	6,000		5.1	
230-153-7	#153	7.17		5.12	6.6				
BT30	230-155-5	#4-1/2 #155	4.8	1.14	2.56	2.76	4,000	6.4	2
BT40	240-153-5	#4-1/4	4.72	.75		2.56	2.76	6,000	6.6
	240-153-7	#153	7.09		5.12		7.3		
	240-155-5	#4-1/2	4.72	1.14	2.76		4,000	7.9	2
	240-155-7	#155	7.09		5.12			10.8	
	240-157-5	#4-5/8	5.31	1.26	3.03		5,000	9.9	3
	240-157-8	#155/#157	7.68		5.39			12.3	
HSK 63A	063-153-7	#4-1/4	7.21	.75	2.56	5.12	6,000	7.7	1
	063-153-10	#153	9.57			7.48		8.5	
	063-155-5	#4-1/2	4.84	1.14		2.76	4,000	7.3	2
	063-155-7		7.21			5.12		10.4	
	063-155-10	#155	9.57	1.26		7.48	5,000	13.2	3
	063-157-8	#4-5/8	7.8			5.39		11.9	
	063-157-10	#155/#157	10.16			7.76		14.3	

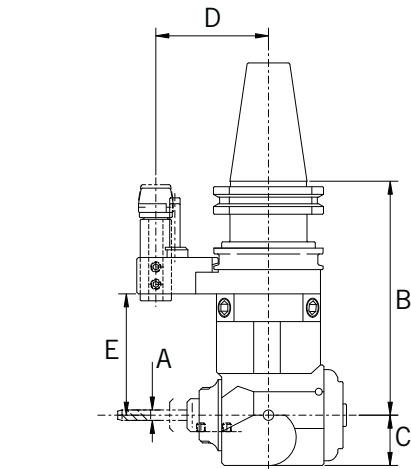


FIG. 1

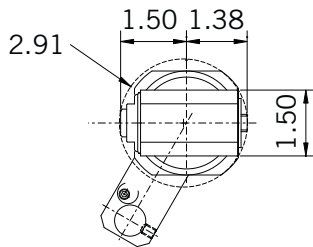


FIG. 2

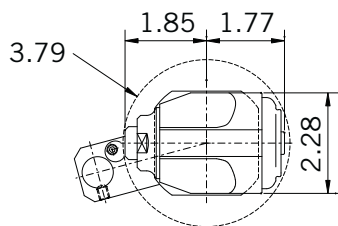
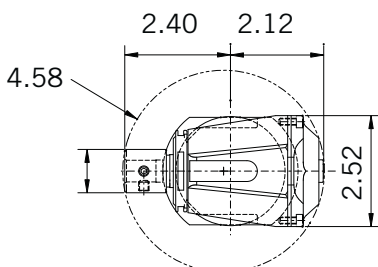


FIG. 3



Note: BT30 Half units are furnished with straight positioning pins. The Common Positioning Block for BT30 is HB-01.

Note: Purchase Common Positioning Blocks (p16) and Tap Sleeves (p16) separately.

Note: * means maximum machine spindle RPM.

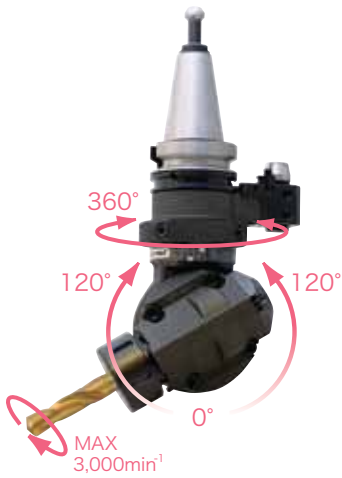
Note: Capto & KM Shanks are available upon request.

MST ANGLE HEADS - HALF UNIVERSAL SERIES

175 TYPE Drilling & Milling

176 & 178 TYPE Drilling & Milling

177 & 179 TYPE Tapping



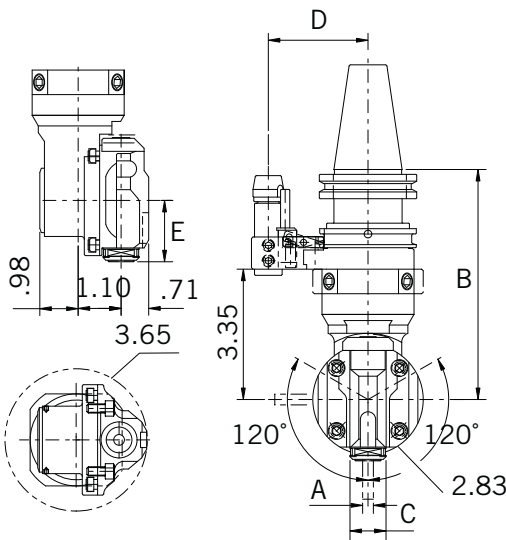
- **COMPACT AND LIGHT WEIGHT DESIGN**
- **CUTTING DIRECTION ANYWHERE FROM 0° TO 360° & 0° TO ±120°**
- **EXCLUSIVELY FOR DRILLING, TAPPING & LIGHT MILLING APPLICATIONS**

GEAR RATIO

M/C Spindle to Angle Head = 2.1 : 1

ROTATING DIRECTION

M/C Spindle to Angle Axis = CW: CW



SHANK	ORDER NO.	RANGE A COLLET/TAP SLEEVE	B	C	D	E	WT (LB.)
CAT40	140-175-6	.039-.276 #070	5.91	.93	2.56	1.54	8.8
	140-176-6	.125-.375 #113		1.26		2.34	9.0
	140-177-6	#4-1/4 TAP #153		.97		1.83	8.8
CAT50	150-175-6	.039-.276 #070	5.91	.93	4.33	1.54	13.5
	150-176-6	.125-.375 #113		1.26		2.34	13.7
	150-177-6	#4-1/4 TAP #153		.97		1.83	15.8
BT40	240-175-5	.039-.276 #070	5.31	.93	2.56	1.54	8.4
	240-176-5	.125-.375 #113		1.26		2.34	8.8
	240-177-5	#4-1/4 TAP #153		.97		1.83	8.4

FIG. 1

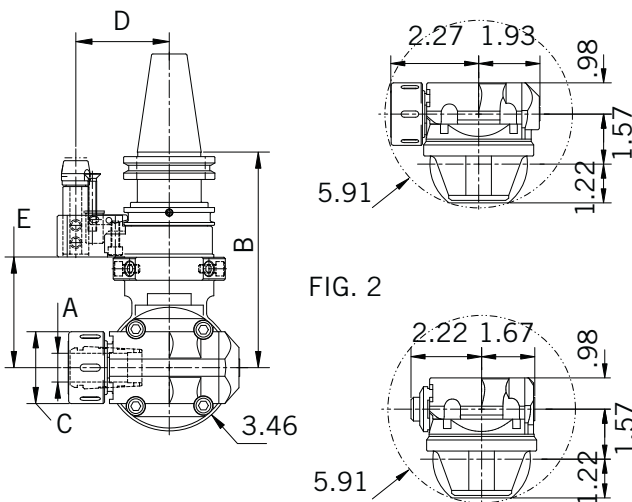


FIG. 2

Bottom View

SHANK	ORDER NO.	RANGE A COLLET	B	C	D	WT (LB.)	FIG.
CAT40	140-178-6	.250-.750 #116	5.91	1.97	2.56	11.0	1
	140-179-6	#4-1/2 TAP #155		1.42		11.0	2
CAT50	150-178-6	.250-.750 #116	5.91	1.97	4.33	15.8	1
	150-179-6	#4-1/2 TAP #155		1.42		15.8	2
BT40	240-178-5	.250-.750 #116	5.31	1.97	2.56	10.6	1
	240-179-5	#4-1/2 TAP #155		1.42		10.6	2

Note: BT30 Half units furnished with straight positioning pins. The Common Positioning Block for BT30 is HB-01.

Note: Purchase Common Positioning Blocks (p16), Tap Sleeves (p16), and collets (p16) separately.

Note: The maximum RPM of machine spindle to angle axis is 6,300 : 3,000.

Note: Capto & KM Shanks are available upon request.

MST ANGLE HEADS - HALF MINI SERIES

- ULTRA SLIM AND LIGHT WEIGHT DESIGN
- CAST IRON HOUSING FOR MAXIMUM RIGIDITY
- IDEAL FOR MILLING, DRILLING, AND TAPPING APPLICATIONS

GEAR RATIO

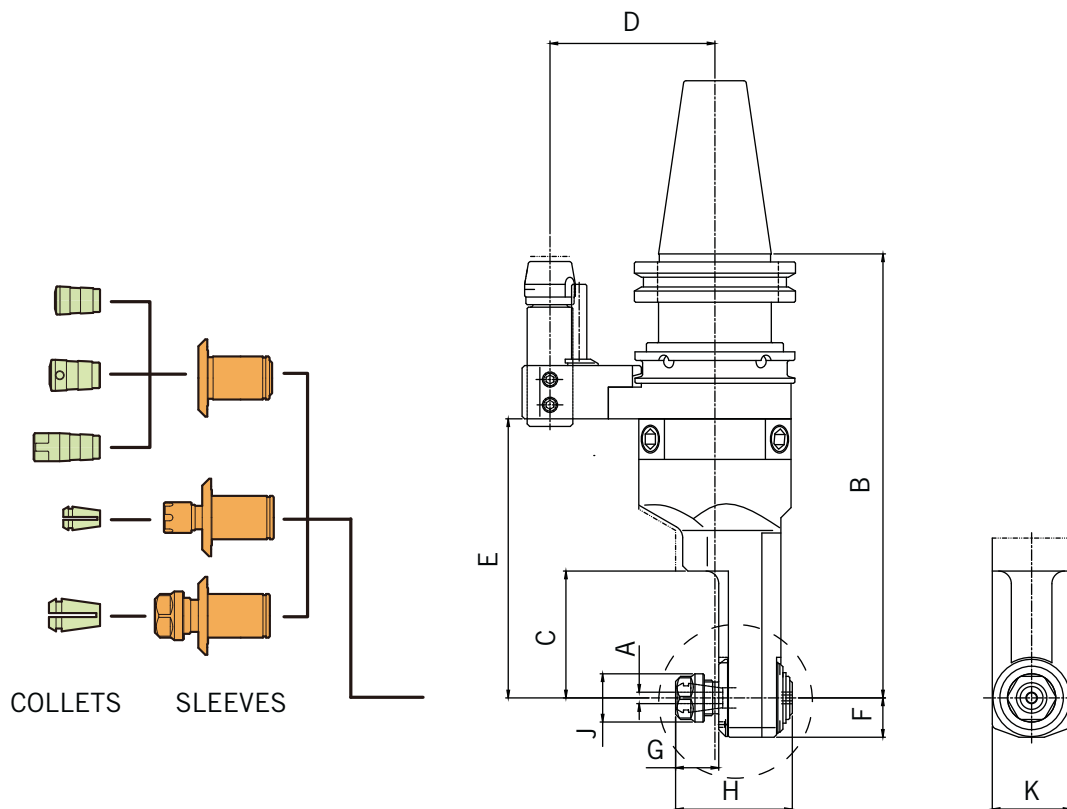
M/C Spindle to Angle Head = 1:0.88

ROTATION DIRECTION

M/C Spindle to Angle Head = CCW: CW



HALF MINI SERIES SYSTEM CHART AND DIMENSION



See next page for details of angle axis with sleeve option.

TAPER	ORDER NO.	RANGE A	B	C	D	E	F	G	H	J	K	MAX RPM**	WT (LB.)
CAT40	140-151-7	.019 - .275	6.89	1.97	2.56	4.33						5,000	6.7
	140-151-9		8.66	3.74	2.56	6.10					7.3		
CAT50	150-151-7		6.89	1.97	4.33	4.33							11.3
	150-151-9		8.66	3.74	4.33	6.10	.61	.67	1.81	.75	1.22		11.7
BT30	230-151-6		6.10	1.97	2.56	3.94							4.0
BT40	240-151-6		6.30	1.97	2.56	4.33							6.2
	240-151-8		8.07	3.74	2.56	6.10							6.7

Note: Half Mini Series units are furnished with built-in HMA-102, #102 (ER11) sleeves as a standard accessory. Other types of sleeves, collets, and common positioning blocks are optional accessories and need to be purchased separately.

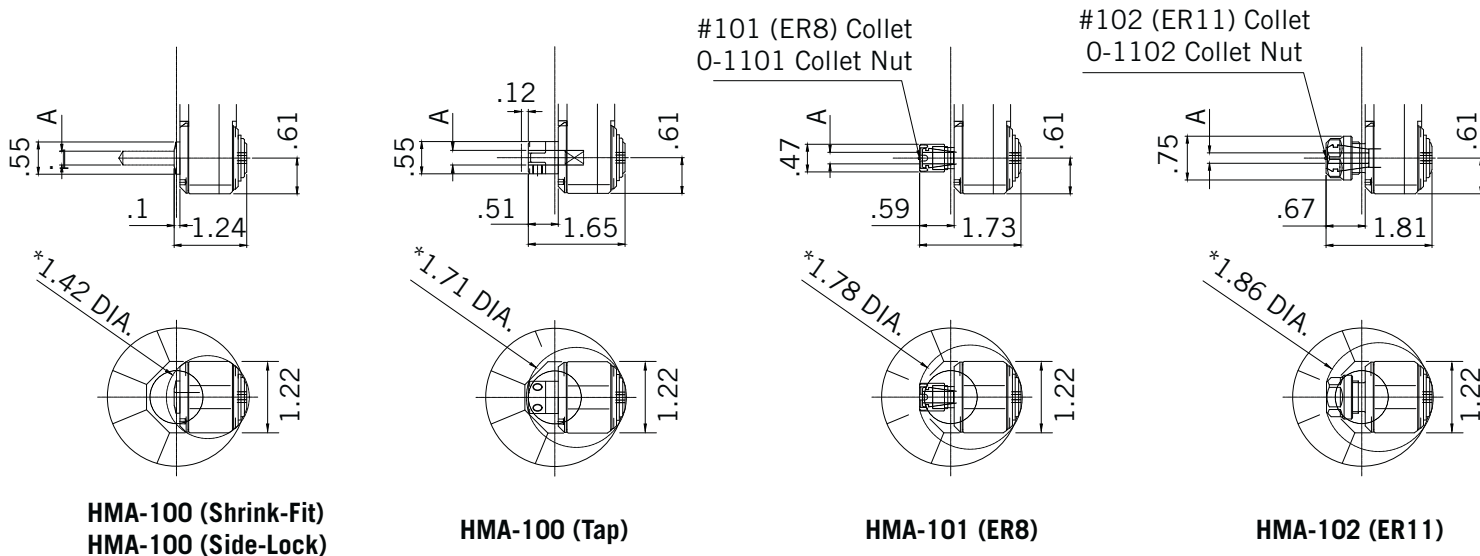
Note: 230-151-6 is furnished with straight positioning pin for the common positioning block, HB-01. Purchase HB-01 separately.

Note: ** means maximum machine spindle RPM.

Note: Capto & KM shanks are available upon request.

MST ANGLE HEADS - HALF MINI SERIES

DETAILS OF ANGLE AXIS



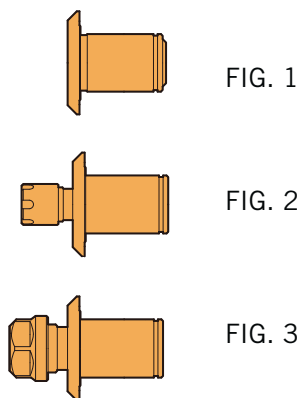
Note: See Half Mini Sleeves & Collet Charts for details of Range A.

Note: Half Mini Shrink-Fit Collets require heating device, HRB-01, for cutting tool insertion. Purchase separately.

Note: Purchase Half Mini Sleeves, Half Mini Collets, and ER8 & ER11 Collets separately.

Note: * means the smallest ID for the head can fit into.

HALF MINI SLEEVES



ORDER NO.	APPLICABLE COLLETS	RANGE A	FIG.
HMA-100	Shrink Fit Collets Side-Lock Collets Tap Collets	—	1
HMA-101	#101 (ER8)	.019-.196	2
HMA-102	#102 (ER11)	.019-.275	3

Note: Purchase Shrink-Fit, Side-Lock, or Tap collets separately for HMA-100.

Note: Purchase #101 (ER8) collets separately for HMA-101.

Note: Purchase #102 (ER11) collets separately for HMA-102.

Note: Wrenches and nuts are furnished for HMA-101 and HMA-102.

HALF MINI COLLETS

SHRINK-FIT



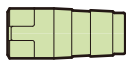
ORDER NO.	RANGE A
HMS-008	.1250
HMS-012	.1875
HMS-016	.2500

SIDE-LOCK



ORDER NO.	RAGNE A
HML-008	.1250
HML-012	.1875
HML-016	.2500

TAP



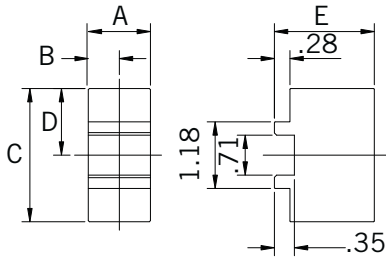
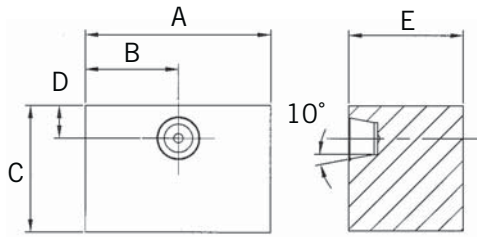
ORDER NO.	TAP SIZE A	SHANK DIA.
HMT-004	#4-#6	.141
HMT-008	#8	.168
HMT-010	#10	.194
HMT-012	#12	.220
HMT-013	1/4	.255

Note: Shrink-Fit collets require heating device, HRB-01 (p80, Cat #211-2) for insertion and removal of cutting tool. Purchase separately.

Note: Shrink-Fit collets available in metric sizes upon request.

MST ANGLE HEADS - ACCESSORIES

COMMON POSITIONING BLOCKS



ORDER NO.	A	B	C	D	E	FIG.
PB-40R	3.60	1.80	2.47	.65	2.23	1
PB-50R	4.76	2.38		.85		
HB-01	1.10	.55	2.36	1.18	1.77	2

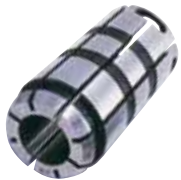
Note: PB-40R for 140, 240, & 063 taper config. PB-50R for 150 and 100 taper config. HB-01 for Half with 230 shank config.
 Note: Common Positioning Blocks must be machined by a purchaser to fit a specific machine spindle.

TAP SLEEVES FOR HALF & HALF UNIVERSAL

SIZE	ORDER NO.	ANGLE HEAD	TAP SIZE	D
#153	1-153-004	153 177	#4 - #6	.141
	1-153-008		#8	.168
	1-153-010		#10	.194
	1-153-012		#12	.220
	1-153-013		1/4	.255
#155	1-155-004	155 157 179	#4 - #6	.141
	1-155-008		#8	.168
	1-155-010		#10	.194
	1-155-012		#12	.220
	1-155-013		1/4	.255
	1-155-014		5/16	.318
	1-155-015		3/8	.381
#157	1-157-017	157	1/2	.367
	1-157-022		5/8	.480

Note: ISO metric size Tap Sleeves are available upon request.

COLLETS FOR HALF AND HALF UNIVERSAL



COLLET SIZE	ORDER NO.	COLLET CHUCK
1/8	0-113-008	#113
3/16	0-113-012*	
1/4	0-113-016	
5/16	0-113-020*	
3/8	0-113-024	
1/4	0-116-016	#116
5/16	0-116-020*	
3/8	0-116-024	
7/16	0-116-028*	
1/2	0-116-032	
5/8	0-116-040	
3/4	0-116-048	



CHUCK SIZE	ORDER NO.	RANGE
#070	0-070-015	.039 - .059
	0-070-020	.059 - .079
	0-070-025	.079 - .098
	0-070-030	.098 - .118
	0-070-040	.118 - .157
	0-070-050	.157 - .197
	0-070-060	.197 - .236
#120	0-070-070	.236 - .276
	0-120-040	.098 - .157
	0-120-060	.157 - .236
	0-120-080	.236 - .315
	0-120-100	.315 - .394
	0-120-120	.394 - .472
0-120-130	.433 - .512	

Note: Collet collapsibility is .008" in diameter on all sizes. * means the size is not in stock.

Note: #113 metric size collets, ranging from 2.6mm to 10mm in 0.2mm increments, are available upon request.

Note: #116 metric collets, ranging from 6mm to 20mm in 0.2mm increments, are available upon request.