

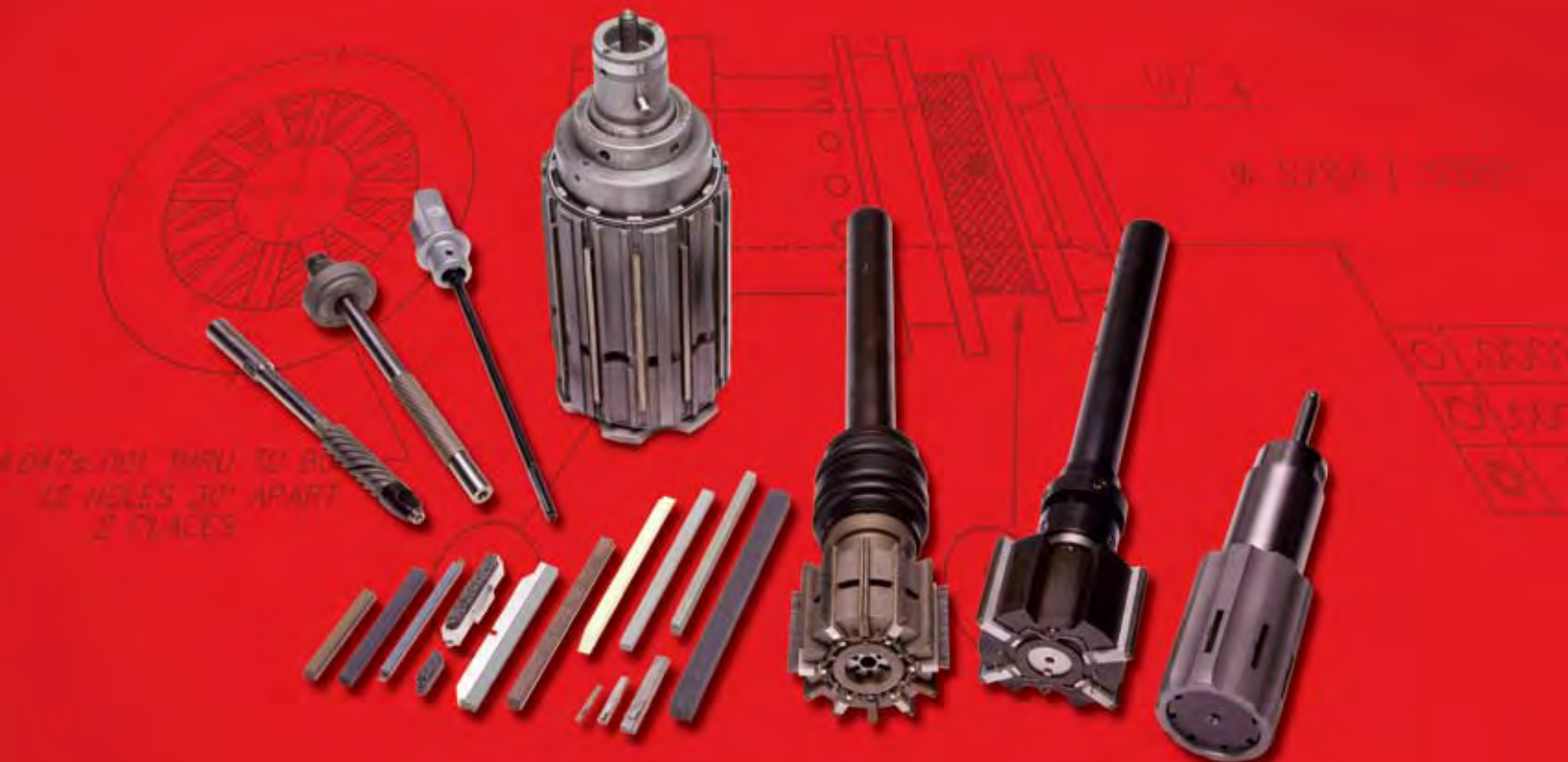


ABOVE AND BEYOND **HONING**



PRECISION HONING SUPPLIES

ABRASIVES | TOOLING | GAGING | FIXTURING | LUBRICANTS | ACCESSORIES



WWW.SUNNEN.COM

X-SP-5500H

WE APPRECIATE THE OPPORTUNITY TO SERVE YOU



Our Global Commitment

Sunnen began selling machines and accessories internationally shortly after the company was founded in 1924. Headquartered in St. Louis, Missouri, Sunnen's worldwide network includes more than 50 authorized distributors. Sunnen's international facilities extend to Switzerland, Italy, the United Kingdom, Poland, Brazil, Belgium, France, Russia, the Czech Republic and China. We are committed to providing products and services wherever they are needed in the world.

Since its beginning Sunnen has concentrated on the technology of precision honing. Today we are the largest, fully integrated company in this field with more than 500 employees.

In this catalog we have assembled a comprehensive guide on tooling, accessories and supplies available for our extensive line of industrial honing machines. The format makes it easy for you to determine your needs and to order everything required for your operation.

Of course, if you have questions, Sunnen's Customer Service is ready to help. Sunnen takes pride in being an organization of friendly, dedicated people ... committed to serving your needs.

World Class Sunnen Abrasives

As the world's foremost authority on honing, Sunnen has incorporated more than 85 years of research and development into a complete and top-quality line of honing abrasives. Sunnen abrasives can be used on both Sunnen systems as well as machines manufactured by others.

Sunnen has a facility in St. Louis dedicated solely to the research, development and manufacturing of abrasives, plated diamond tooling and honing lubricants.

With Sunnen abrasives, you get exactly what you need, when you need it. Before any stone is shipped, we grade and qualify it requiring it to endure the most exacting quality-control standards in the industry to assure you of the most precise honing performance available today.



From Start to Finish Sunnen is on Your Team

Sunnen service just starts with the delivery of your machine. From operator training to problem solving, to fast parts and accessories shipment, Sunnen is on your team.

Service in Your Shop

Sunnen's factory-trained sales engineers and service specialists help get your new Sunnen equipment set up and running, and they follow through to help solve technical problems, train new operators and keep you up-to-date on shop operations.

Built and Backed by Sunnen...

...Your assurance of the precision work that helps maintain the highest quality in your products. Sunnen tooling, abrasives, honing fluids, bore gages and accessories are designed to fit the specific requirements of our equipment ... and to meet the high standards that have made Sunnen Products Company the world leader in honing technology since 1924.

This Catalog Makes it Easy For You...

to select and order everything you need for the operation of your Sunnen equipment.

**If You Have Questions, Problems
or Need Technical Assistance...
Just Call Toll Free (in the USA):**

1-800-325-3670

Customers Outside the U.S.A. please Contact
Your Local Authorized Sunnen Distributor.

www.sunnen.com

Sunnen equipment, accessories and supplies are manufactured in our 45,150 sq. meter (486,000 sq. ft.) plant equipped with the most advanced production and quality control systems.

SUNNEN BORE SIZING AND FINISHING...

For many years Sunnen's hallmark product was the widely popular manual honing machine. We now offer a wide variety of precision honing systems for specialized applications as well as automated high-production packages.

Whether the bore you need to size is small or large, simple or complex, Sunnen has the complete system for you... just contact your Sunnen Field Engineer or authorized Sunnen International Distributor.

Vertical Honing Systems



Sunnen offers a vertical honing system for virtually any budget and any application from the fast, economical SV-10 to systems that are capable of holding extremely tight tolerances to customizable systems, engineered for you to fit your exact requirements. Sunnen vertical systems are reliable, durable and economical.



Horizontal Honing Systems



Sunnen's line of horizontal honing machines range from the versatile MBB-1660, found in tool rooms around the world, to the ML line of power-stroked machines – all built for speed and precision. The extremely accurate KGM KROSSGRINDING® system rounds out the line of horizontal machines.



Tube Honing Machines



Sunnen's HT Series tube honing systems are designed for a wide range of industries and processes. These versatile systems boast features such as: a unique tool expansion and feed system; PC or PLC controlled stroke position, motion, stone feed and cutting; automatic bore geometry correction; and servo rack or chain drive. Whatever your application – from aircraft components to gun barrels to very large hydraulic cylinders – Sunnen has a high performance tube honing system for you.



PERFECT FOR ALL TYPES OF APPLICATIONS

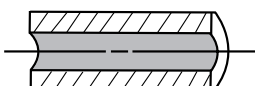
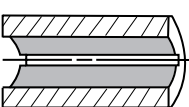
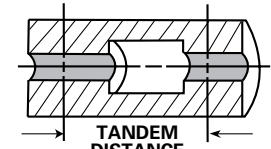
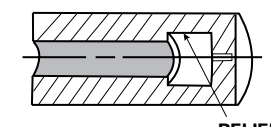
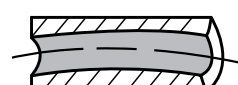
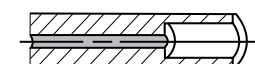
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Honing Unit Selection Guide

How To Select A Honing Unit

The honing unit best suited to any particular job depends on the type and dimension of the bore, material to be honed and tolerance required. The honing unit group can be selected from the table below. Specific mandrels and honing stones are selected from pages indicated in the table. For complete information on honing stones and surface finish see pages 12.1 and 12.2.

HONING UNIT SELECTION GUIDE	BORE DESCRIPTION AND HONING UNIT REQUIREMENTS	BORE DIAMETER							
		1.52 to 2.54mm .060"-.100"	2.54 to 3.05mm .100"-.120"	3.05 to 3.81mm .120"-.150"	3.81 to 4.70mm .150"-.185"	4.70 to 6.22mm .185"-.245"	6.22 to 7.82mm .245"-.308"	7.82 to 9.40mm .308"-.370"	
PEDESTAL MACHINES (ML, EC, MBB, & LBB)	OPEN HOLES WITH NO INTERRUPTIONS  <p>Select a honing unit with stone length 2/3 to 1-1/2 times bore length. If honing units shown have stone length too long, shorten the stones as instructed on page 12.3.</p>	SHORT HOLE (Length less than 5 times diameter.)	D2 pgs. 2.0-2.1	K3 pgs. 2.2-2.3	K4 pgs. 2.6-2.7	K5 pgs. 2.10-2.11	K6 pg. 2.14	K8 pg. 2.18	K10 pg. 2.22
	LONG HOLE (Length more than 5 times diameter.)	D2 pgs. 2.0-2.1	BL3 pgs. 2.4-2.5	BL4 pgs. 2.8-2.9	BL5 pgs. 2.12-2.13	BL6, L6 pgs. 2.16-2.17	BL8, L8 pgs. 2.20-2.21	BL10, L10 pgs. 2.24-2.25	
PLAYED TOOLING (KGM & VSS MACHINES)	OPEN HOLES WITH KEYWAYS OR SPLINES  <p>Bores with interruptions such as these require keyway honing units. Stone should be 2/3 to 1-1/2 times bore length. Not suitable for blind hole work.</p>						Y8, YY8 pgs. 2.52-2.53	Y10, YY10 pgs. 2.54-2.55	
	OPEN HOLES WITH TANDEM LANDS  <p>Tandem bores require a stone length at least twice the distance. If honing units are not available with sufficient stone length, alter the stones as instructed on page 12.4.</p>	D2 pgs. 2.0-2.1	K3 pgs. 2.2-2.3 BL3 pgs. 2.4-2.5	K4 pgs. 2.6-2.7 BL4 pgs. 2.8-2.9	K5 pgs. 2.10-2.11 BL5 pgs. 2.12-2.13	K6 pg. 2.14 BL6, L6 pgs. 2.16-2.17	K8 pg. 2.18 BL8, L8 pgs. 2.20-2.21	K10 pg. 2.22 BL10, L10 pgs. 2.24-2.25	
CYLINDER HONING (SV-410 & SV-10 MACHINES)	BLIND HOLES  <p>Select a honing unit with stone length 2/3 times bore length. If Honing units shown have stone length too long, shorten the stones as instructed on page 12.3. Be sure shank is long enough to permit stone to reach bottom in hole.</p>		K3 pgs. 2.2-2.3 BL3 pgs. 2.4-2.5	K4 pgs. 2.6-2.7 BL4 pgs. 2.8-2.9	K5 pgs. 2.10-2.11 BL5 pgs. 2.12-2.13	K6 pg. 2.14 JK6 pg. 2.15 BL6 pg. 2.16 L6 pg. 2.17	K8 pg. 2.18 JK8 pg. 2.19 BL8 pg. 2.20 L8 pg. 2.21	K10 pg. 2.22 JK10 pg. 2.23 BL10 pg. 2.24 L10 pg. 2.25	
	BOWED HOLE  <p>For bow correction use a honing unit with a long stone, preferably 1-1/2 times as long as the bore. Be sure shank is long enough to permit correct stroking.</p>	Mandrels with guide shoes generally correct bow better than tools without guide shoes.							
PORTABLE, MPS & TUBE HOME ABRASIVES	HOLE WITH COUNTERBORE OR OVERHANG  <p>Mandrel shank must be long enough to reach the surface to be honed and permit overstroke of approximately 1/3 stone length. If counterbore is only on one end, and tolerances are not critical, part may be honed from opposite end only and honing unit selection made as for a plain hole.</p>								

To Select A Honing Unit, Follow These 2 Steps

1. Identify sketch most closely resembling bore to be honed.
2. See page listed for selection of most suitable honing unit.

NOTE: Be sure stone length fits general requirements discussed with the sketches, and that mandrel shank is long enough if a counterbore is present. Dimensions are given on each page.

BORE DIAMETER													
9,40 to 12,57mm .370"- .495"	12,57 to 15,72mm .495"- .619"	15,72 to 18,90mm .619"- .744"	18,90 to 19,68mm .744"- .775"	19,68 to 25,48mm .775"- 1.000"	25,40 to 26,19mm 1.000"- 1.031"	26,19 to 31,75mm 1.031"- 1.250"	31,75 to 34,93mm 1.250"- 1.375"	34,93 to 44,45mm 1.375"- 1.750"	44,45 to 69,85mm 1.750"- 2.750"	69,85 to 92,08mm 2.750"- 3.625"	92,08 to 101,60mm 3.625"- 3.875"	101,60 to 152,40mm 3.875"- 6.000"	
K12 pg. 2.26	K16 pg. 2.30	K20 pg. 2.34	AK20 pg. 2.38	AK20 pg. 2.38	P28 pgs. 2.46-2.50 AK20 pg. 2.38	P28 pgs. 2.46-2.50 AK20 pg. 2.38	P28 pgs. 2.46-2.50	P28 pgs. 2.46-2.50	P28 pgs. 2.46-2.50	P28 pgs. 2.46-2.50 AN-600 pg. 2.85	P28 pgs. 2.46-2.50 AN-600 pg. 2.85	P28 pgs. 2.46-2.50 AN-600 pg. 2.85	
BL12, L12 pgs. 2.28-2.29	BL16, L16 pgs. 2.32-2.33	BL20, L20 pgs. 2.36-2.37 P20 pgs. 2.42-2.45	BAL20, AL20 pgs. 2.40-2.41 P20 pgs. 2.42-2.45	BAL20, AL20 pgs. 2.40-2.41 P20 pgs. 2.42-2.45	BAL20, AL20 pgs. 2.40-2.41 P20 pgs. 2.42-2.45	P28 pgs. 2.46-2.50	P28 pgs. 2.46-2.50	P28 pgs. 2.46-2.50	P28 pgs. 2.46-2.50	P28 pgs. 2.46-2.50			
Y12, YY12 pgs. 2.56-2.57	Y16, YY16 pgs. 2.58-2.59	Y20 pgs. 2.60-2.61 YY24 pgs. 2.64-2.65	Y20 pgs. 2.60-2.61 YY24 pgs. 2.64-2.65	AAY20 pgs. 2.62-2.63	Y32 pgs. 2.66-2.67 YY32 pgs. 2.68-2.69	Y32 pgs. 2.66-2.67 YY32 pgs. 2.68-2.69	Y32 pgs. 2.66-2.67 YY32 pgs. 2.68-2.69	Y44 pgs. 2.70-2.71 YY48 pgs. 2.72-2.73	Y56 pgs. 2.74-2.75 Y72 pgs. 2.76-2.77	Y88 pgs. 2.78-2.79 Y104 pgs. 2.80-2.81 AN-600 pg. 2.85	Y104 pgs. 2.80-2.81 AN-600 pg. 2.85	AN-600 pg. 2.85	
K12 pg. 2.26 BL12, L12 pgs. 2.28-2.29	K16 pg. 2.30 BL16, L16 pgs. 2.32-2.33	K20 pg. 2.34 BL20, L20 pgs. 2.36-2.37 P20 pgs. 2.42-2.45	AK20 pg. 2.38 BAL20, AL20 pgs. 2.40-2.41 P20 pgs. 2.42-2.45	AK20 pg. 2.38 BAL20, AL20 pgs. 2.40-2.41 P28 pgs. 2.46-2.50	P28 pgs. 2.46-2.50 AK20 pg. 2.38	P28 pgs. 2.46-2.50	P28 pgs. 2.46-2.50	P28 pgs. 2.46-2.50	P28 pgs. 2.46-2.50	P28 pgs. 2.46-2.50	P20 pgs. 2.42-2.45	P20 pgs. 2.42-2.45	
K12 pg. 2.26 JK12 pg. 2.27 BL12, L12 pgs. 2.28-2.29	K16 pg. 2.30 JK16 pg. 2.31 BL16, L16 pgs. 2.32-2.33	K20 pg. 2.34 JK20 pg. 2.35 BL20, L20 pgs. 2.36-2.37	AK20 pg. 2.38 JAK20 pg. 2.39 BAL20, AL20 pgs. 2.40-2.41	AK20 pg. 2.38 JAK20 pg. 2.39 BAL20, AL20 pgs. 2.40-2.41	AK20 pg. 2.38 JAK20 pg. 2.39 BAL20, AL20 pgs. 2.40-2.41 R28 pg. 2.51	AK20 pg. 2.38 JAK20 pg. 2.39 BAL20, AL20 pgs. 2.40-2.41 R28 pg. 2.51	R28 pg. 2.51	R28 pg. 2.51	R28 pg. 2.51 AN-600 pg. 2.85	R28 pg. 2.51 AN-600 pg. 2.85	R28 pg. 2.51 AN-600 pg. 2.85	R28 pg. 2.51 AN-600 pg. 2.85	

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MB, & LB)

PLATED TOOLING
(KGM & VSS MACHINES)

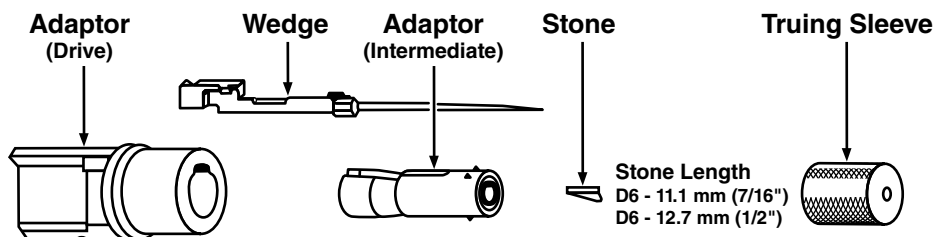
CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MP & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

D2 Honing Units

Diameter Range:
1,52 mm – 2,54 mm
.060" – .100"



Note: D2 Mandrels cannot be modified for blind holes.

Order 1-5 For Complete D2 Honing Units

Diameter Range 1,52 mm – 2,54 mm .060" – .100"		1 D2 Mandrel Wedge not included			1 D2-L Mandrel Wedge not included			2 Wedge		3 Truing Sleeve		D2A-S Adapter Set 1 Each	
		With Standard Shank Choose One Suffix			With Extra-Long Shank Choose One Suffix			W-Standard Length WL-Extended Length Choose One Suffix				Drive Adapter	Intermediate Adapter
1,524-1,575	.060-.062	D2A-060	S	H	D2A-060L	S*	H*	D2A	-W	-WL	S-060	D2-A	D2-I
1,575-1,626	.062-.064	D2A-062	S	H	D2A-062L	S*	H*	D2A	-W	-WL	S-062	D2-A	D2-I
1,626-1,676	.064-.066	D2B-064	S	H	D2B-064L	S*	H*	D2B	-W	-WL	S-064	D2-A	D2-I
1,676-1,727	.066-.068	D2B-066	S	H	D2B-066L	S*	H*	D2B	-W	-WL	S-066	D2-A	D2-I
1,727-1,778	.068-.070	D2C-068	S	H	D2C-068L	S*	H*	D2C	-W	-WL	S-068	D2-A	D2-I
1,778-1,829	.070-.072	D2C-070	S	H	D2C-070L	S*	H*	D2C	-W	-WL	S-070	D2-A	D2-I
1,829-1,880	.072-.074	D2D-072	S	H	D2D-072L	S*	H*	D2D	-W	-WL	S-072	D2-A	D2-I
1,880-1,930	.074-.076	D2D-074	S	H	D2D-074L	S*	H*	D2D	-W	-WL	S-074	D2-A	D2-I
1,930-1,981	.076-.078	D2E-076	S	H	D2E-076L	S*	H*	D2E	-W	-WL	S-076	D2-A	D2-I
1,981-2,032	.078-.080	D2E-078	S	H	D2E-078L	S*	H*	D2E	-W	-WL	S-078	D2-A	D2-I
2,032-2,083	.080-.082	D2F-080	S	H	D2F-080L	S*	H*	D2F	-W	-WL	S-080	D2-A	D2-I
2,083-2,134	.082-.084	D2F-082	S	H	D2F-082L	S*	H*	D2F	-W	-WL	S-082	D2-A	D2-I
2,134-2,184	.084-.086	D2F-084	S	H	D2F-084L	S*	H*	D2F	-W	-WL	S-084	D2-A	D2-I
2,184-2,235	.086-.088	D2F-086	S	H	D2F-086L	S*	H*	D2F	-W	-WL	S-086	D2-A	D2-I
2,235-2,286	.088-.090	D2F-088	S	H	D2F-088L	S*	H*	D2F	-W	-WL	S-088	D2-A	D2-I
2,286-2,337	.090-.092	D2F-090	S	H	D2F-090L	S*	H*	D2F	-W	-WL	S-090	D2-A	D2-I
2,337-2,388	.092-.094	D2F-092	S	H	D2F-092L	S*	H*	D2F	-W	-WL	S-092	D2-A	D2-I
2,388-2,438	.094-.096	D2F-094	S	H	D2F-094L	S*	H*	D2F	-W	-WL	S-094	D2-A	D2-I
2,438-2,489	.096-.098	D2F-096	S	H	D2F-096L	S*	H*	D2F	-W	-WL	S-096	D2-A	D2-I
2,489-2,540	.098-.100	D2F-098	S	H	D2F-098L	S*	H*	D2F	-W	-WL	S-098	D2-A	D2-I

Mandrels in this size range use D6 stones. Order from D6 stone selection table at right.

Mandrels in this size range use D8 stones. Order from D8 stone selection table at right.

Mandrel Options

S = Steel Mandrel w/ soft shoes, for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.

* 1st choice
** 2nd choice. Use if A65 does not cut.
*** 3rd choice. Use if A63 does not cut.

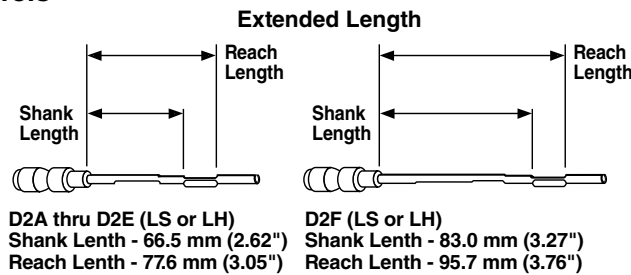
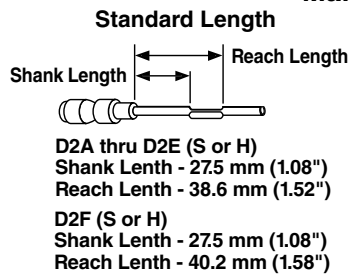
Recommended Stones for D2A-060 thru D2E-078 Mandrels

Material	Low-Volume		High-Volume	
	Stone to use	Approx. Ra Surface Finish µm µin	Stone to use	Approx. Ra Surface Finish µm µin
Deburring: rough holes, all materials				
	D6-A67	—	D6-A67	—
Fast removal: deburred, bored, ground, reamed holes				
Aluminum	D6-J67	0,83 33	D6-DM87	1,25 50
Brass, Soft	D6-J63	0,83 33	D6-J63	0,83 33
Bronze	D6-J67	0,83 33	D6-J67	0,83 33
Carbide	D6-DM57	0,50 20	D6-DM57	0,05 20
Cast Iron	D6-J67	0,30 12	D6-DM57	2,00 80
Ceramic	D6-DM57	1,00 40	D6-DM57	1,00 40
Glass	D6-DM57	1,75 70	D6-DM57	1,75 70
Steel, Soft	D6-A67	0,50 20	D6-NM69	1,00 40
Steel, Hardened*	D6-A65	0,30 12	D6-NM69	0,70 28
Steel, Hardened**	D6-A63	0,30 12	—	—
Steel, Very	D6-NM69	0,70 28	—	—
Fine finishing: previously honed holes				
Aluminum	D6-J95	0,15 6	D6-DM07	0,83 33
Brass, Soft	D6-J93	0,30 12	D6-J93	0,30 12
Bronze	D6-J95	0,30 12	D6-J95	0,30 12
Carbide	D6-DR07	0,08 3	D6-DM07	0,08 3
Cast Iron	D6-J95	0,13 5	D6-DM07	0,50 20
Ceramic	D6-DR07	0,38 15	D6-DM07	0,38 15
Glass	D6-DR07	0,38 15	D6-DM07	0,38 15
Steel, Soft	D6-J95	0,10 4	D6-NM89	0,65 7
Steel, Hardened	D6-J93	0,08 3	D6-NM89	0,50 3

* Special Order - Contact Customer Service

D2 Honing Units

Mandrels



In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

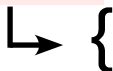
Available Stones

		Grit Size							
		150	220	280	320	400	500	600	900 1200
H---S	H---S	Aluminum Oxide Stones (A) - 12 per box							
				D6-A63 D6-A65 D6-A67					
	H---S			D8-A63 D8-A65 D8-A67					
H---S	H---S	Silicon Carbide Stones (J,C) - 12 per box							
				D6-J63 D6-J65 D6-J67		D6-J93 D6-J95 D6-J97		D6-C05	
	H---S			D8-J63 D8-J65 D8-J67		D8-J93 D8-J95 D8-J97		D8-C05	
Hard-----Soft	Hard-----Soft	Diamond (D) & CBN Stones (N) - Metal (M), Resin (R), Vitrified (V) Bond - 1 per box							
		D6-DM55 D6-DM57		D6-DR67		D6-DM87		D6-DR07 D6-DM07	
	Hard-----Soft			D6-NR63		D6-NR83			
		D6-NM55 D6-NM57		D6-NM65 D6-NM67 D6-NM69		D6-NM85 D6-NM87 D6-NM89	D6-NM95	D6-NM05 D6-NM07	
Hard-----Soft	Hard-----Soft			D8-DR67				D8-DR07	
		D8-DM55 D8-DM57				D8-DM87 D8-NR83		D8-DM05 D8-DM07	
	Hard-----Soft			D8-NM63					
		D8-NM55 D8-NM57		D8-NM65 D8-NM67 D8-NM69		D8-NM85 D8-NM87 D8-NM89		D8-NM05 D8-NM07	

Recommended Stones for D2F-080 thru D2F-098 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _a Surface Finish µm	µin	Stone to use	Approx. R _a Surface Finish µm	µin
Deburring: rough holes, all materials						
	D8-A67	—	—	D8-A67	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	D8-J67	0,83	33	D8-DM87	1,25	50
Brass, Soft	D8-J65	0,83	33	D8-J65	0,83	33
Bronze	D8-J67	0,83	33	D8-J67	0,83	33
Carbide	D8-DM57	0,50	20	D8-DM57	0,50	20
Cast Iron	D8-J67	0,30	12	D8-DM57	2,00	80
Ceramic	D8-DM57	1,00	40	D8-DM57	1,00	40
Glass	D8-DM57	1,75	70	D8-DM57	1,75	70
Steel, Soft	D8-A67	0,50	20	D8-NM69	1,00	40
Steel, Hardened*	D8-A65	0,30	12	D8-NM67	0,70	28
Steel, Hardened**	D8-A65	0,30	12	—	—	—
Steel, Very	D8-NM67	0,70	28	—	—	—
Fine finishing: previously honed holes						
Aluminum	D8-J95	0,15	6	D8-DM07	0,83	33
Brass, Soft	D8-J95	0,30	12	D8-J93	0,30	12
Bronze	D8-J95	0,30	12	D8-J95	0,30	12
Carbide	D8-DR07	0,08	3	D8-DM07	0,08	3
Cast Iron	D8-J95	0,13	5	D8-DM07	0,50	20
Ceramic	D8-DR07	0,38	15	D8-DM07	0,38	15
Glass	D8-DR07	0,38	15	D8-DM07	0,38	15
Steel, Soft	D8-J95	0,10	4	D8-NM89	0,65	7
Steel, Hardened	D8-J95	0,08	3	D8-NM87	0,50	3

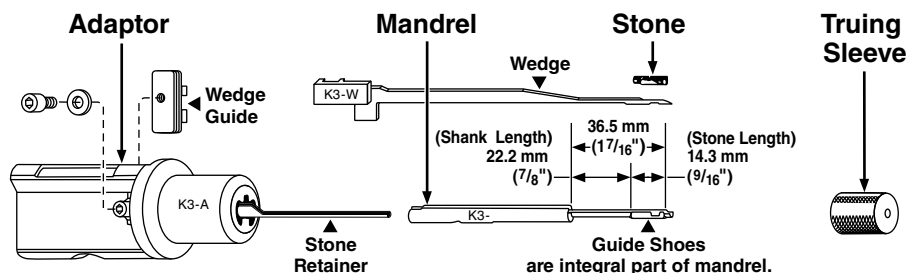
* 1st choice
** 2nd choice. Use if A65 does not cut.
*** 3rd choice. Use if A63 does not cut.



K3

Honing Units

Diameter Range:
2,54 mm – 3,05 mm
.100" – .120"



Order 1-5 For Complete K3 Honing Units

Diameter Range 2,54 mm - 3,05 mm .100" - .120"		1 K3 Mandrel Includes wedge				2 Truing Sleeve	3 Adapter	4 Alignment Bushing	5 Honing Stone
		With Standard Shank Choose One Suffix					With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
2,54-2,59	.100-.102	K3-100C	S	H	B	S-100	K3-A	C-100	See All Stone Tables At Right
2,59-2,64	.102-.104	K3-102C	S	H	B	S-102	K3-A	C-102	
2,64-2,69	.104-.106	K3-104C	S	H	B	S-104	K3-A	C-104	
2,69-2,74	.106-.108	K3-106C	S	H	B	S-106	K3-A	C-106	
2,74-2,79	.108-.110	K3-108C	S	H	B	S-108	K3-A	C-108	
2,79-2,84	.110-.112	K3-110C	S	H	B	S-110	K3-A	C-110	
2,84-2,90	.112-.114	K3-112C	S	H	B	S-112	K3-A	C-112	
2,90-2,95	.114-.116	K3-114C	S	H	B	S-114	K3-A	C-114	
2,95-3,00	.116-.118	K3-116C	S	H	B	S-116	K3-A	C-116	
3,00-3,05	.118-.120	K3-118C	S	H	B	S-118	K3-A	C-118	

Mandrel Options

S = Steel Mandrel w/ soft shoes, for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for producing very fine finishes and honing exotic metals.

K3 Mandrel Replacement Parts

K3-W Wedge
 Replace when wear *begins* to show.
LN-3025C Stone Retainer
LN-3211A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some honing applications. Another advantage of Super Mandrels is faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. Select appropriate soft steel mandrel and add-D.+

Example: K3-100CS-D.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Sunnen Honing Units can be used to size two or more "in-line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

+ Special Order - Contact Customer Service

K3

Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Available Stones		Grit Size											
		70	80	100	150	220	280	320	400	500	600	900	1200
Hard-----Soft		Aluminum Oxide Stones (A) - 12 per box											
						K3-A55 K3-A57	K3-A61 K3-A63 K3-A65 K3-A67 K3-A69 K3-A611	K3-A75 K3-A77 K3-A79					
Hard--Soft		Silicon Carbide Stones (J,C) - 12 per box											
							K3-J63 K3-J65 K3-J67		K3-J83 K3-J85 K3-J87 K3-J89	K3-J93 K3-J95 K3-J97 K3-J99	K3-C05†		
Hard-----Soft		Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box											
					K3-DMB45 K3-DM47	K3-DM55 K3-DM57 K3-DV57			K3-DM85 K3-DM87		K3-DM05 K3-DM07 K3-DV07		K3-DR007
					K3-NM45 K3-NM49	K3-NR53 K3-NMG57 K3-NM55 K3-NM57	K3-NR63 K3-NM65 K3-NM67 K3-NM69		K3-NR83 K3-NM85 K3-NM87 K3-NM89		K3-NM05		

†For best results, use with bronze mandrel.

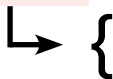
Recommended Stones for K3 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin
Deburring: rough holes, all materials						
	K3-A611	—	—	K3-A611	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	K3-J67	0,83	33	K3-DM87	1,25	50
Brass, Soft	K3-J65	0,83	33	K3-J65	0,83	33
Bronze	K3-J67	0,83	33	K3-J67	0,83	33
Carbide	K3-DM57	0,50	20	K3-DM57	0,50	20
Cast Iron	K3-J67	0,30	12	K3-DM57	2,00	80
Ceramic	K3-DM57	1,00	40	K3-DM57	1,00	40
Glass	K3-DM57	1,75	70	K3-DM57	1,75	70
Steel, Soft	K3-A67	0,50	20	K3-NM45	1,25	50
Steel, Hardened*	K3-A65	0,30	12	K3-NM45	1,12	45
Steel, Hardened**	K3-A65	0,30	12	—	—	—
Steel, Very	K3-NM65	0,70	28	—	—	—
Fine finishing: previously honed holes						
Aluminum	K3-J95	0,30	12	K3-DM07	0,83	33
Brass, Soft	K3-J85	0,40	16	K3-J83	0,40	16
Bronze	K3-J95	0,30	12	K3-J95	0,30	12
Carbide	K3-DM07	0,08	3	K3-DM07	0,08	3
Cast Iron	K3-J95	0,13	5	K3-DM07	0,50	20
Ceramic	K3-DM07	0,38	15	K3-DM07	0,38	15
Glass	K3-DM07	0,38	15	K3-DM07	0,38	15
Steel, Soft	K3-J95	0,10	4	K3-NM05	0,40	16
Steel, Hardened	K3-J85	0,13	5	K3-NM05	0,18	7

* 1st choice

** 2nd choice.
Use if A65 does not cut.

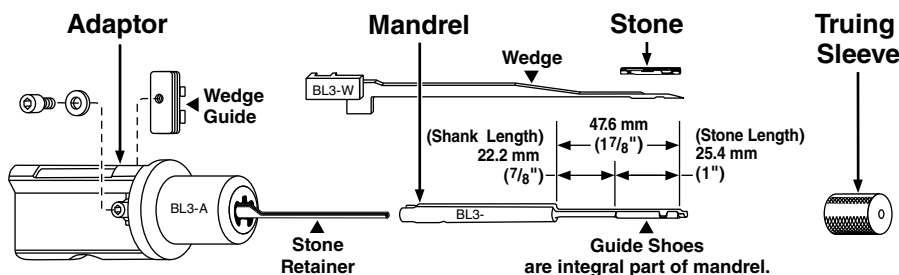
*** 3rd choice.
Use if A63 does not cut.



BL3

Honing Units

Diameter Range:
2,54 mm – 3,05 mm
.100" – .120"



Order 1-5 For Complete BL3 Honing Units

Diameter Range 2,54 mm – 3,05 mm .100" – .120"		1 BL3 Mandrel Includes wedge	2 Truing Sleeve	3 Adapter	4 Alignment Bushing	5 Honing Stone
mm	inches	With Standard Shank Choose One Suffix			With stone retainer and wedge guide	For machines with fully adjustable spindle nose
2,54-2,59	.100-.102	BL3-100C	S H B	S-100	BL3-A	C-100
2,59-2,64	.102-.104	BL3-102C	S H B	S-102	BL3-A	C-102
2,64-2,69	.104-.106	BL3-104C	S H B	S-104	BL3-A	C-104
2,69-2,74	.106-.108	BL3-106C	S H B	S-106	BL3-A	C-106
2,74-2,79	.108-.110	BL3-108C	S H B	S-108	BL3-A	C-108
2,79-2,84	.110-.112	BL3-110C	S H B	S-110	BL3-A	C-110
2,84-2,90	.112-.114	BL3-112C	S H B	S-112	BL3-A	C-112
2,90-2,95	.114-.116	BL3-114C	S H B	S-114	BL3-A	C-114
2,95-3,00	.116-.118	BL3-116C	S H B	S-116	BL3-A	C-116
3,00-3,05	.118-.120	BL3-118C	S H B	S-118	BL3-A	C-118

See
All Stone
Tables
At Right

Mandrel Options

S = Steel Mandrel w/ soft shoes, for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing, hard, rough, carbide, ceramic and glass.
B = Bronze Mandrel for producing very fine finishes and honing exotic metals.

BL3 Mandrel Replacement Parts

BL3-W Wedge
Replace when wear *begins* to show.
LN-3025C Stone Retainer
LN-3211A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some honing applications. Another advantage of Super Mandrels is faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. Select appropriate soft steel mandrel and add-D.+

Example: BL3-100CS-D.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Sunnen Honing Units can be used to size two or more "in-line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

+ Special Order - Contact Customer Service

BL3

Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

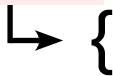
Available Stones												
Grit Size												
70 80 100 150 220 280 320 400 500 600 900 1200												
Hard-----Soft	Aluminum Oxide Stones (A) - 12 per box											
					L3-A55 L3-A57	L3-A61 L3-A63 L3-A65 L3-A67 L3-A69 L3-A611	L3-A75 L3-A77 L3-A79					
Hard--Soft	Silicon Carbide Stones (J,C) - 12 per box											
						L3-J63 L3-J65 L3-J67	L3-J83 L3-J85 L3-J87 L3-J89	L3-J93 L3-J95 L3-J97 L3-J99	L3-C05†			
Hard-----Soft	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box											
				L3-DMB45	L3-DM55 L3-DM57 L3-DV57 L3-NR53 L3-NMG57	L3-DM65 L3-NM65 L3-NM67 L3-NM69	L3-DM85 L3-DM87	L3-NR83	L3-NM85 L3-NM87 L3-NM89	L3-NM95	L3-DM05 L3-DM07 L3-DV07 L3-NM05 L3-NM07	L3-DR007

†For best results, use with bronze mandrel.

Recommended Stones for BL3 Mandrels

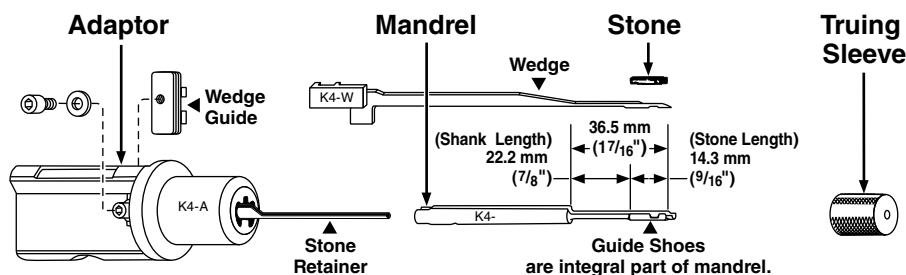
Material	Low-Volume				High-Volume			
	Stone to use	Approx. R _a Surface Finish μm	Approx. R _a Surface Finish pin		Stone to use	Approx. R _a Surface Finish μm	Approx. R _a Surface Finish pin	
Deburring: rough holes, all materials								
	L3-A611	—	—		L3-A611	—	—	
Fast removal: deburred, bored, ground, reamed holes								
Aluminum	L3-J67	0,83	33		L3-DM87	1,25	50	
Brass, Soft	L3-J65	0,83	33		L3-J65	0,83	33	
Bronze	L3-J67	0,83	33		L3-J67	0,83	33	
Carbide	L3-DM57	0,50	20		L3-DM57	0,50	20	
Cast Iron	L3-J67	0,30	12		L3-DM57	2,00	80	
Ceramic	L3-DM57	1,00	40		L3-DM57	1,00	40	
Glass	L3-DM57	1,75	70		L3-DM57	1,75	70	
Steel, Soft	L3-A67	0,50	20		L3-NM55	1,25	50	
Steel, Hardened*	L3-A65	0,30	12		L3-NM55	1,12	45	
Steel, Hardened**	L3-A65	0,30	12		—	—	—	
Steel, Very Hard***	L3-NM65	0,70	28		—	—	—	
Fine finishing: previously honed holes								
Aluminum	L3-J95	0,30	12		L3-DM07	0,83	33	
Brass, Soft	L3-J85	0,40	16		L3-J85	0,40	16	
Bronze	L3-J95	0,30	12		L3-J95	0,30	12	
Carbide	L3-DM07	0,08	3		L3-DM07	0,08	3	
Cast Iron	L3-J95	0,13	5		L3-DM07	0,50	20	
Ceramic	L3-DM07	0,38	15		L3-DM07	0,38	15	
Glass	L3-DM07	0,38	15		L3-DM07	0,38	15	
Steel, Soft	L3-J95	0,10	4		L3-NM05	0,40	16	
Steel, Hardened	L3-J85	0,13	5		L3-NM05	0,18	7	

* 1st choice
** 2nd choice. Use if A65 does not cut.
*** 3rd choice. Use if A63 does not cut.



K4 Honing Units

Diameter Range:
3,05 mm – 3,81 mm
.120" – .150"



Order 1-5 For Complete K4 Honing Units

Diameter Range 3,05 mm - 3,81 mm .120" - .150"		1 K4 Mandrel Includes wedge				2 Truing Sleeve		3 Adapter		4 Alignment Bushing		5 Honing Stone	
mm	inches	With Standard Shank Choose One Suffix					With stone retainer and wedge guide		For machines with fully adjustable spindle nose				
3,05-3,17	.120-.125	K4-120C	S	H	B	S-120	K4-A	C-120	See All Stone Tables At Right				
3,17-3,30	.125-.130	K4-125C	S	H	B	S-125	K4-A	C-125					
3,30-3,43	.130-.135	K4-130C	S	H	B	S-130	K4-A	C-130					
3,43-3,56	.135-.140	K4-135C	S	H	B	S-135	K4-A	C-135					
3,56-3,68	.140-.145	K4-140C	S	H	B	S-140	K4-A	C-140					
3,68-3,81	.145-.150	K4-145C	S	H	B	S-145	K4-A	C-145					

Mandrel Options

S = Steel Mandrel w/ soft shoes, for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for producing very fine finishes and honing exotic metals.

K4 Mandrel Replacement Parts

K4-W Wedge
 Replace when wear *begins* to show.
LN-3025C Stone Retainer
LN-3211A Wedge Guide

Diamond Plated Super Mandrels⁺

Designed to provide a long-wearing guide shoe to increase mandrel life in some honing applications. Another advantage of Super Mandrels is faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. The following mandrels are available from stock: **K4-120CSD**, **K4-125CSD**, **K4-135CSD**. Select appropriate soft steel mandrel and add-D.

Example: K4-130CS-D.

Full-Carbide Shoe Mandrels⁺

Recommended to be used for high-production situations. When ordering, specify starting and finish diameter.

Extended Shank Mandrels⁺

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels⁺

Sunnen Honing Units can be used to size two or more "in-line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

⁺ Special Order - Contact Customer Service

K4

Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

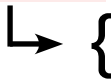
Available Stones		Grit Size											
		70	80	100	150	220	280	320	400	500	600	900	1200
Hard-----Soft	Hard-----Soft	Aluminum Oxide Stones (A) - 12 per box											
	Hard-----Soft					K4-A55 K4-A57	K4-A61 K4-A63 K4-A65 K4-A67 K4-A69 K4-A611	K4-A75 K4-A77 K4-A79					
	Hard-----Soft	Silicon Carbide Stones (J,C) - 12 per box											
	Hard-----Soft						K4-J63 K4-J65 K4-J67 K4-J68		K4-J83 K4-J85 K4-J87 K4-J89	K4-J93 K4-J95 K4-J97 K4-J99	K4-C05†		
Hard-----Soft	Hard-----Soft	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box											
	Hard-----Soft				K4-DMB45 K4-DM47	K4-DM55 K4-DM57 K4-DV57			K4-DM85 K4-DM87 K4-DV87	K4-DMB95	K4-DM05 K4-DM07 K4-DV07		K4-DR007
	Hard-----Soft			K4-NM35	K4-NM45 K4-NM47 K4-NM49	K4-NM53 K4-NMG57 K4-NM55 K4-NM57 K4-NM59	K4-NR63 K4-NM65 K4-NM67 K4-NM69		K4-NR83 K4-NM85 K4-NM87 K4-NM89		K4-NM05 K4-NM07 K4-NM09		K4-NM005

†For best results, use with bronze mandrel.

Recommended Stones for K4 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _a Surface Finish µm µin		Stone to use	Approx. R _a Surface Finish µm µin	
Deburring: rough holes, all materials						
	K4-A611	—	—	K4-A611	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	K4-J67	0,83	33	K4-DM87	1,25	50
Brass, Soft	K4-J63	0,83	33	K4-J63	0,83	33
Bronze	K4-J67	0,83	33	K4-J67	0,83	33
Carbide	K4-DM57	0,50	20	K4-DM57	0,50	20
Cast Iron	K4-J67	0,30	12	K4-DM57	2,00	80
Ceramic	K4-DM57	1,00	40	K4-DM57	1,00	40
Glass	K4-DM57	1,75	70	K4-DM57	1,75	70
Steel, Soft	K4-A67	0,75	30	K4-NM45	1,25	50
Steel, Hardened*	K4-A65	0,30	12	K4-NM45	1,12	45
Steel, Hardened**	K4-A63	0,30	12	—	—	—
Steel, Very Hard***	K4-NM65	0,70	28	—	—	—
Fine finishing: previously honed holes						
Aluminum	K4-J95	0,30	12	K4-DM07	0,83	33
Brass, Soft	K4-J95	0,40	16	K4-J83	0,40	16
Bronze	K4-J95	0,30	12	K4-J95	0,30	12
Carbide	K4-DM07	0,08	3	K4-DM07	0,08	3
Cast Iron	K4-J95	0,13	5	K4-DM07	0,50	20
Ceramic	K4-DM07	0,38	15	K4-DM07	0,38	15
Glass	K4-DM07	0,38	15	K4-DM07	0,38	15
Steel, Soft	K4-J95	0,10	4	K4-NM05	0,40	16
Steel, Hardened	K4-J83	0,13	5	K4-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A65 does not cut.
*** 3rd choice. Use if A63 does not cut.



Automatic Size Control Probes

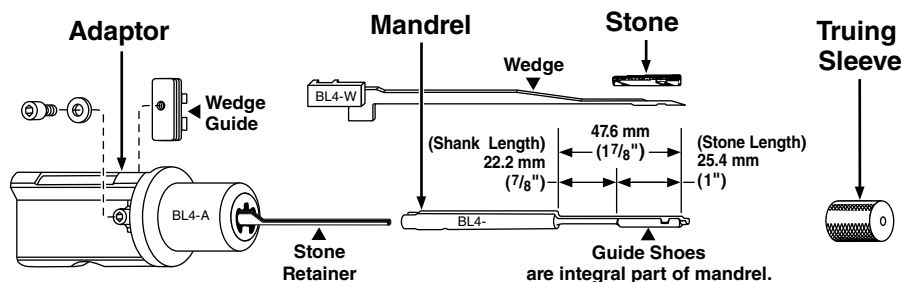
3,05mm - 3,91mm (.120"-.154")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	in	High mm	in
ASC-0125	3,18	1/8	3,05	.120	3,53	.139
ASC-0141	3,57	9/64	3,42	.135	3,91	.154

BL4 Honing Units

Diameter Range:
3,05 mm – 3,81 mm
.120" – .150"



Order 1-5 For Complete BL4 Honing Units

Diameter Range 3,05 mm - 3,81 mm .120" - .150"		1 BL4 Mandrel Includes wedge	2 Truing Sleeve	3 Adapter	4 Alignment Bushing	5 Honing Stone
mm	inches	With Standard Shank Choose One Suffix		With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
3,05-3,17	.120-.125	BL4-120C	S H B	S-120	BL4-A	C-120
3,17-3,30	.125-.130	BL4-125C	S H B	S-125	BL4-A	C-125
3,30-3,43	.130-.135	BL4-130C	S H B	S-130	BL4-A	C-130
3,43-3,56	.135-.140	BL4-135C	S H B	S-135	BL4-A	C-135
3,56-3,68	.140-.145	BL4-140C	S H B	S-140	BL4-A	C-140
3,68-3,81	.145-.150	BL4-145C	S H B	S-145	BL4-A	C-145
						See All Stone Tables At Right

Mandrel Options

S = Steel Mandrel w/ soft shoes, for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for producing very fine finishes and honing exotic metals.

BL4 Mandrel Replacement Parts

BL4-W Wedge
Replace when wear **begins** to show.
LN-3025C Stone Retainer
LN-3211A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some honing applications. Another advantage of Super Mandrels is faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. Select appropriate soft steel mandrel and add -D.+

Example: BL4-120CS-D.+

Full-Carbide Shoe Mandrels+

Recommended to be used for high-production situations. When ordering, specify starting and finish diameter.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Sunnen Honing Units can be used to size two or more "in-line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

+ Special Order - Contact Customer Service

BL4

Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Available Stones		Grit Size											
		70	80	100	150	220	280	320	400	500	600	900	1200
Soft	Hard	Aluminum Oxide Stones (A) - 12 per box											
						L4-A55 L4-A57	L4-A61 L4-A63 L4-A65 L4-A67 L4-A69 L4-A611	L4-A75 L4-A77 L4-A79					
Hard	Soft	Silicon Carbide Stones (J,C) - 12 per box											
							L4-J63 L4-J65 L4-J67 L4-J68		L4-J83 L4-J85 L4-J87 L4-J89	L4-J93 L4-J95 L4-J97 L4-J99	L4-C05†		
Hard	Soft	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box											
					L4-DMB45 L4-DM47	L4-DM55 L4-DM57 L4-DV57 L4-NR53 L4-NMG57 L4-NM45 L4-NM47	L4-NR63 L4-NM65 L4-NM67 L4-NM69		L4-DM85 L4-DM87 L4-NR83 L4-NM85 L4-NM87 L4-NM89		L4-DM05 L4-DM07 L4-DV07 L4-NM05		L4-DR007

†For best results, use with bronze mandrel.

Recommended Stones for BL4 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _a Surface Finish µm µin		Stone to use	Approx. R _a Surface Finish µm µin	
Deburring: rough holes, all materials						
	L4-A611	—	—	L4-A611	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	L4-J67	0,83	33	L4-DM87	1,25	50
Brass, Soft	L4-J65	0,83	33	L4-J65	0,83	33
Bronze	L4-J67	0,83	33	L4-J67	0,83	33
Carbide	L4-DM57	0,50	20	L4-DM57	0,50	20
Cast Iron	L4-J67	0,30	12	L4-DM57	2,00	80
Ceramic	L4-DM57	1,00	40	L4-DM57	1,00	40
Glass	L4-DM57	1,75	70	L4-DM57	1,75	70
Steel, Soft	L4-A67	0,75	30	L4-NM45	1,25	50
Steel, Hardened*	L4-A65	0,30	12	L4-NM45	1,12	45
Steel, Hardened**	L4-A65	0,30	12	—	—	—
Steel, Very Hard***	L4-NM65	0,70	28	—	—	—
Fine finishing: previously honed holes						
Aluminum	L4-J95	0,30	12	L4-DM07	0,83	33
Brass, Soft	L4-J95	0,40	16	L4-J85	0,40	16
Bronze	L4-J95	0,30	12	L4-J95	0,30	12
Carbide	L4-DM07	0,08	3	L4-DM07	0,08	3
Cast Iron	L4-J95	0,13	5	L4-DM07	0,50	20
Ceramic	L4-DM07	0,38	15	L4-DM07	0,38	15
Glass	L4-DM07	0,38	15	L4-DM07	0,38	15
Steel, Soft	L4-J95	0,10	4	L4-NM05	0,40	16
Steel, Hardened	L4-J85	0,13	5	L4-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A65 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

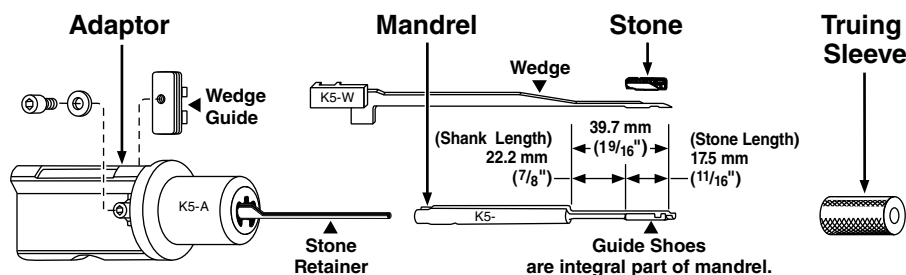
3,05mm - 3,91mm (.120"-.154")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	in	High mm	in
ASC-0125	3,18	1/8	3,05	.120	3,53	.139
ASC-0141	3,57	9/64	3,42	.135	3,91	.154

K5 Honing Units

Diameter Range:
3,81 mm – 4,70 mm
.150" – .185"



Order 1-5 For Complete K5 Honing Units

Diameter Range 3,81 mm - 4,70 mm .150" - .185"		1 K5 Mandrel Includes wedge	2 Truing Sleeve	3 Adapter	4 Alignment Bushing	5 Honing Stone
mm	inches	With Standard Shank Choose One Suffix			With stone retainer and wedge guide	For machines with fully adjustable spindle nose
3,81-3,94	.150-.155	K5-150C	S H B	S-150	K5-A	C-150
3,94-4,06	.155-.160	K5-155C	S H B	S-155	K5-A	C-155
4,06-4,19	.160-.165	K5-160C	S H B	S-160	K5-A	C-160
4,19-4,32	.165-.170	K5-165C	S H B	S-165	K5-A	C-165
4,32-4,44	.170-.175	K5-170C	S H B	S-170	K5-A	C-170
4,44-4,57	.175-.180	K5-175C	S H B	S-175	K5-A	C-175
4,57-4,70	.180-.185	K5-180C	S H B	S-180	K5-A	C-180

See All
Stone Tables
At Right

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for very fine finishes and honing exotic metals.

K5 Mandrel Replacement Parts

K5-W Wedge
Replace when wear *begins* to show.
LN-3025C Stone Retainer
LN-3211A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some honing applications. Another advantage of Super Mandrels is faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. The following mandrels are available from stock: **K5-155CSD**. Select appropriate soft steel mandrel and add -D.+

Example: K5-150CS-D.+

Full-Carbide Shoe Mandrels+

Recommended to be used for high-production situations. When ordering, specify starting and finish diameter.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Sunnen Honing Units can be used to size two or more "in-line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

+ Special Order - Contact Customer Service

K5

Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Available Stones from Stock

	Grit Size											
	70	80	100	150	220	280	320	400	500	600	900	1200
Soft-----Hard	Aluminum Oxide Stones (A) - 12 per box											
					K5-A55 K5-A57	K5-A61 K5-A63 K5-A65 K5-A67 K5-A69 K5-A611	K5-A75 K5-A77 K5-A79					
Soft-----Hard	Silicon Carbide Stones (J,C) - 12 per box											
					K5-J57	K5-J63 K5-J65 K5-J67 K5-J69	K5-J83 K5-J85 K5-J87 K5-J89	K5-J93 K5-J95 K5-J97 K5-J99		K5-C05†		
Soft-----Hard	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box											
				K5-DMB45 K5-DM47	K5-DM55 K5-DM57 K5-DV57			K5-DM85 K5-DM87 K5-DV87		K5-DM05 K5-DM07 K5-DV07		K5-DR007
			K5-NM35	K5-NM45 K5-NM49	K5-NR53 K5-NMG57 K5-NM55 K5-NM57 K5-NM59	K5-NR63 K5-NM65 K5-NM67 K5-NM69		K5-NR83 K5-NM85 K5-NM87 K5-NM89	K5-NM95	K5-NM05 K5-NM07	K5-NM905	K5-NM005

†For best results, use with bronze mandrel.

Recommended Stones for K5 Mandrels

Material	Low-Volume		High-Volume	
	Stone to use	Approx. R _a Surface Finish µm µin	Stone to use	Approx. R _a Surface Finish µm µin
Deburring: rough holes, all materials				
	K5-A611	—	K5-A611	—
Fast removal: deburred, bored, ground, reamed holes				
Aluminum	K5-J67	0,83 33	K5-DM87	1,25 50
Brass, Soft	K5-J63	0,83 33	K5-J63	0,83 33
Bronze	K5-J67	0,83 33	K5-J67	0,83 33
Carbide	K5-DM57	0,50 20	K5-DM57	0,50 20
Cast Iron	K5-J67	0,30 12	K5-DM57	2,00 80
Ceramic	K5-DM57	1,00 40	K5-DM57	1,00 40
Glass	K5-DM57	1,75 70	K5-DM57	1,75 70
Steel, Soft	K5-A67	0,75 30	K5-NM45	1,25 50
Steel, Hardened*	K5-A65	0,30 12	K5-NM45	1,12 45
Steel, Hardened**	K5-A63	0,30 12	—	—
Steel, Very Hard***	K5-NM65	0,70 28	—	—
Fine finishing: previously honed holes				
Aluminum	K5-J95	0,30 12	K5-DM07	0,83 33
Brass, Soft	K5-J95	0,40 16	K5-J83	0,40 16
Bronze	K5-J95	0,30 12	K5-J95	0,30 12
Carbide	K5-DM07	0,08 3	K5-DM07	0,08 3
Cast Iron	K5-J95	0,13 5	K5-DM07	0,50 20
Ceramic	K5-DM07	0,38 15	K5-DM07	0,38 15
Glass	K5-DM07	0,38 15	K5-DM07	0,38 15
Steel, Soft	K5-J95	0,10 4	K5-NM05	0,40 16
Steel, Hardened	K5-J83	0,13 5	K5-NM05	0,18 7

* 1st choice
** 2nd choice. Use if A65 does not cut.
*** 3rd choice. Use if A63 does not cut.



Automatic Size Control Probes

3,81mm - 4,70mm (.150"-.185")

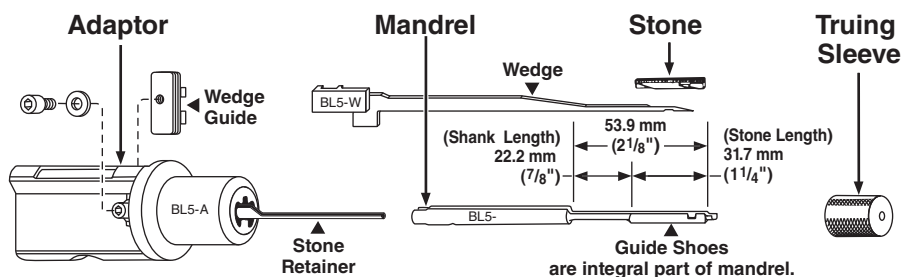
For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	Low in	High mm	High in
ASC-0156	4	5/32	3,81	.150	4,29	.169
ASC-0172	4,36	11/64	4,22	.166	4,70	.185

BL5

Honing Units

Diameter Range:
3,81 mm – 4,70 mm
.150" – .185"



Order 1-5 For Complete BL5 Honing Units

Diameter Range 3,81 mm - 4,70 mm .150" - .185"		1 BL5 Mandrel Includes wedge	2 Truing Sleeve	3 Adapter	4 Alignment Bushing	5 Honing Stone
		With Standard Shank Choose One Suffix		With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
3,81-3,94	.150-.155	BL5-150C	S H B	S-150	BL5-A	C-150
3,94-4,06	.155-.160	BL5-155C	S H B	S-155	BL5-A	C-155
4,06-4,19	.160-.165	BL5-160C	S H B	S-160	BL5-A	C-160
4,19-4,32	.165-.170	BL5-165C	S H B	S-165	BL5-A	C-165
4,32-4,44	.170-.175	BL5-170C	S H B	S-170	BL5-A	C-170
4,44-4,57	.175-.180	BL5-175C	S H B	S-175	BL5-A	C-175
4,57-4,70	.180-.185	BL5-180C	S H B	S-180	BL5-A	C-180
						See All Stone Tables At Right

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for very fine finishes and honing exotic metals.

BL5 Mandrel Replacement Parts

BL5-W Wedge
Replace when wear *begins* to show.
LN-3025C Stone Retainer
LN-3211A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some honing applications. Another advantage of Super Mandrels is faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. Select appropriate soft steel mandrel and add -D.+

Example: BL5-150CS-D.+

Full-Carbide Shoe Mandrels+

Recommended to be used for high-production situations. When ordering, specify starting and finish diameter.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Sunnen Honing Units can be used to size two or more "in-line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

+ Special Order - Contact Customer Service

BL5

Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Available Stones		Grit Size											
		70	80	100	150	220	280	320	400	500	600	900	1200
Soft	Hard	Aluminum Oxide Stones (A) - 12 per box											
						L5-A55 L5-A57	L5-A61 L5-A63 L5-A65 L5-A67 L5-A69 L5-A611	L5-A75 L5-A77 L5-A79					
Soft	Hard	Silicon Carbide Stones (J,C) - 12 per box											
							L5-J63 L5-J65 L5-J67 L5-J69		L5-J83 L5-J85 L5-J87 L5-J89	L5-J93 L5-J95 L5-J97 L5-J99	L5-C05†		
Soft	Hard	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box											
					L5-DMB45 L5-DM47	L5-DMB55 L5-DM55 L5-DM57 L5-DV57 L5-NR53 L5-NMG57 L5-NM45 L5-NM49	L5-DMB65 L5-NR61 L5-NR63 L5-NM65 L5-NM67 L5-NM69		L5-DM85 L5-DM87 L5-DV87 L5-NR83 L5-NM85 L5-NM87 L5-NM89		L5-DM05 L5-DM07 L5-DV07 L5-NM05		L5-DR007 L5-DM007 L5-NM005 L5-NM007

†For best results, use with bronze mandrel.

Recommended Stones for BL5 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin
Deburring: rough holes, all materials						
	L5-A611	—	—	L5-A611	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	L5-J67	0,83	33	L5-DM87	1,25	50
Brass, Soft	L5-J63	0,83	33	L5-J63	0,83	33
Bronze	L5-J67	0,83	33	L5-J67	0,83	33
Carbide	L5-DM57	0,50	20	L5-DM57	0,50	20
Cast Iron	L5-J67	0,30	12	L5-DM57	2,00	80
Ceramic	L5-DM57	1,00	40	L5-DM57	1,00	40
Glass	L5-DM57	1,75	70	L5-DM57	1,75	70
Steel, Soft	L5A67	0,75	30	L5-NM45	1,25	50
Steel, Hardened*	L5-A65	0,30	12	L5-NM45	1,12	45
Steel, Hardened**	L5-A63	0,30	12	—	—	—
Steel, Very Hard***	L5-NM65	0,70	28	—	—	—
Fine finishing: previously honed holes						
Aluminum	L5-J95	0,30	12	L5-DM07	0,83	33
Brass, Soft	L5-J95	0,40	16	L5-J83	0,40	16
Bronze	L5-J95	0,30	12	L5-J95	0,30	12
Carbide	L5-DM07	0,08	3	L5-DM07	0,08	3
Cast Iron	L5-J95	0,13	5	L5-DM07	0,50	20
Ceramic	L5-DM07	0,38	15	L5-DM07	0,38	15
Glass	L5-DM07	0,38	15	L5-DM07	0,38	15
Steel, Soft	L5-J95	0,10	4	L5-NM05	0,40	16
Steel, Hardened	L5-J83	0,13	5	L5-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A65 does not cut.
*** 3rd choice. Use if A63 does not cut.



Automatic Size Control Probes

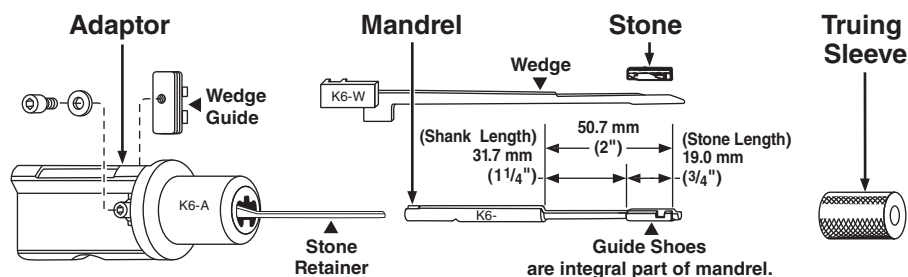
3,81mm - 4,70mm (.150"-.185")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	Low in	High mm	High in
ASC-0156	4	5/32	3,81	.150	4,29	.169
ASC-0172	4,36	11/64	4,22	.166	4,70	.185

K6 Honing Units

Diameter Range:
4,70 mm – 6,22 mm
.185" – .245"



Order 1-5 For Complete K6 or J-K6 Honing Units

Diameter Range 4,70 mm - 6,22 mm .185" - .245"		1 K6 Mandrel Includes wedge	1 J-K6 Mandrel Includes wedge	2 Truing Sleeve	3 Adapter For J-K6 mandrel order J-K6-A adapter	4 Alignment Bushing	5 Honing Stone
		With Standard Shank Choose One Suffix	Steel Mandrel With Extra-Long Shank Choose One Suffix		With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
4,70-4,83	.185-.190	K6-185C	J-K6-185C	S-185	K6-A	C-187	See All Stone Tables At Right
4,83-4,95	.190-.195	K6-190C	J-K6-190C	S-190	K6-A	C-190	
4,95-5,08	.195-.200	K6-195C	J-K6-195C	S-195	K6-A	C-195	
5,08-5,21	.200-.205	K6-200C	J-K6-200C	S-200	K6-A	C-200	
5,21-5,33	.205-.210	K6-205C	J-K6-205C	S-205	K6-A	C-205	
5,33-5,46	.210-.215	K6-210C	J-K6-210C	S-210	K6-A	C-210	
5,46-5,59	.215-.220	K6-215C	J-K6-215C	S-215	K6-A	C-215	
5,59-5,71	.220-.225	K6-220C	J-K6-220C	S-220	K6-A	C-220	
5,71-5,84	.225-.230	K6-225C	J-K6-225C	S-225	K6-A	C-225	
5,84-5,97	.230-.235	K6-230C	J-K6-230C	S-230	K6-A	C-230	
5,97-6,10	.235-.240	K6-235C	J-K6-235C	S-235	K6-A	C-235	
6,10-6,22	.240-.245	K6-240C	J-K6-240C	S-240	K6-A	C-240	

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for very fine finishes and honing exotic metals.
NOTE: J-K6 Mandrels not available in bronze.

Retractable Mandrels

For high production, automation and high stress loads using superabrasive stones. See page 2.86.
NOTE: Available in KR6+ only.

K6 Mandrel Replacement Parts

K6-W Wedge
Replace when wear *begins* to show.
LN-3087C Stone Retainer
LN-3211A Wedge Guide

Replacement Parts for J-K6 Mandrels

J-K6-W Wedge
Replace when wear *begins* to show.
LN-3590A Stone Retainer
LN-3211A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some applications...plus faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. The following mandrels are available from stock:
K6-185CSD, K6-195CSD and K6-205CSD.
Select appropriate soft steel mandrel and add -D.+

Example: K6-185CS-D.+

Carbide Shoe Mandrels+

Two types are available for high-production applications...in either Round Carbide Rod Inserted or Full Carbide Shoe Mandrels. In the correct application they last longer than standard hardened mandrels. When ordering full-carbide type specify starting and finish diameter.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

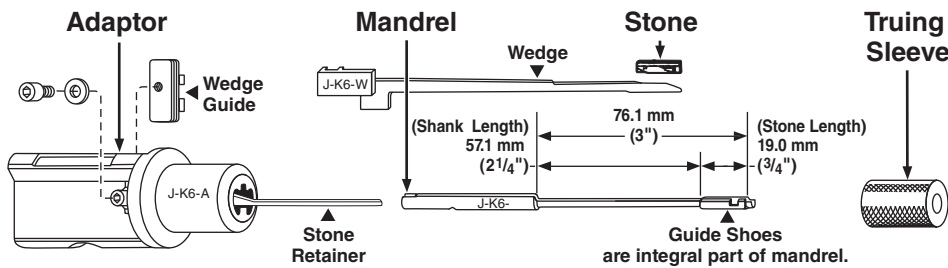
Tandem "In-Line" Mandrels+

Used to size two or more "in-line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

+ Special Order - Contact Customer Service

J-K6 Honing Units

Extra-Long
Shank



J-K6 Mandrels are similar to the K6 Mandrels except the shanks are 25.4 mm (1") longer and should be used only when counterbores will not allow holes to be honed properly with standard K6 Mandrels.

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Available Stones		Grit Size											
		70	80	100	150	220	280	320	400	500	600	900	1200
Soft	Hard	Aluminum Oxide Stones (A) - 12 per box											
					K6-A43		K6-A61						
Soft	Hard	Silicon Carbide Stones (J,C) - 12 per box											
					K6-J45	K6-J55	K6-J63		K6-J83	K6-J93			
Soft	Hard	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vittrified (V) Bond - 1 per box											
					K6-DMB45								K6-DR007
Soft	Hard				K6-DM45	K6-DM55			K6-DM85		K6-DM05		
					K6-DM47	K6-DM57			K6-DM87		K6-DM07		
Soft	Hard					K6-DV57			K6-DV87		K6-DV07		
							K6-NR61		K6-NR83				
Soft	Hard				K6-NM35	K6-NM53	K6-NR63						
					K6-NM45	K6-NMG57	K6-NM65		K6-NM85	K6-NM95	K6-NM05	K6-NM905	K6-NM005
Soft	Hard				K6-NM47	K6-NM55	K6-NM65		K6-NM87	K6-NM97	K6-NM07		
					K6-NM49	K6-NM57	K6-NM67		K6-NM89				
Soft	Hard					K6-NM59	K6-NM69						

‡For best results, use with bronze mandrel.

Recommended Stones for K6 and J-K6 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _a Surface Finish µm	Approx. R _a Surface Finish pin	Stone to use	Approx. R _a Surface Finish µm	Approx. R _a Surface Finish pin
Deburring: rough holes, all materials						
	K6-A413	—	—	K6-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	K6-J57	1,38	55	K6-DM87	1,25	50
Brass, Soft	K6-J63	0,83	33	K6-J63	0,83	33
Bronze	K6-J57	1,38	55	K6-J57	1,38	55
Carbide	K6-DM57	0,50	20	K6-DM57	0,50	20
Cast Iron	K6-J57	0,50	20	K6-DM57	2,00	80
Ceramic	K6-DM57	1,00	40	K6-DM57	1,00	40
Glass	K6-DM57	1,75	70	K6-DM57	1,75	70
Steel, Soft	K6-A57	0,75	30	K6-NM45	1,25	50
Steel, Hardened*	K6-A55	0,30	12	K6-NM45	1,12	45
Steel, Hardened**	K6-A63	0,30	12	—	—	—
Steel, Very Hard***	K6-NM65	0,70	28	—	—	—
Fine finishing: previously honed holes						
Aluminum	K6-J95	0,30	12	K6-DM07	0,83	33
Brass, Soft	K6-J83	0,40	16	K6-J83	0,40	16
Bronze	K6-J95	0,30	12	K6-J95	0,30	12
Carbide	K6-DM07	0,08	3	K6-DM07	0,08	3
Cast Iron	K6-J95	0,13	5	K6-DM07	0,50	20
Ceramic	K6-DM07	0,38	15	K6-DM07	0,38	15
Glass	K6-DM07	0,38	15	K6-DM07	0,38	15
Steel, Soft	K6-J95	0,10	4	K6-NM05	0,40	16
Steel, Hardened	K6-J83	0,13	5	K6-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

4,57mm - 6,22mm (.180"-.245")

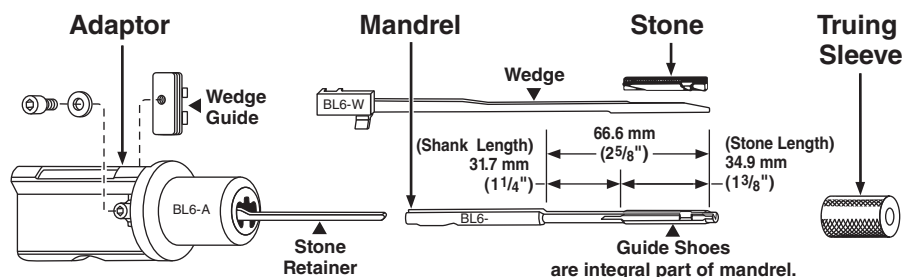
For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	Low in	High mm	High in
ASC-0188	4,76	3/16	4,57	.180	5,05	.199
ASC-0203	5	13/64	4,85	.191	5,33	.210
ASC-0219	5,56	7/32	5,36	.211	5,84	.230
ASC-0234	6	15/64	5,74	.226	6,22	.245

BL6

Honing Units

Diameter Range:
4,70 mm – 6,22 mm
.185" – .245"



Order 1-5 For Complete BL6 or L6 Honing Units

Diameter Range 4,70 mm - 6,22 mm .185" - .245"		1 BL6 Mandrel Includes wedge	1 L6 Mandrel Includes wedge	2 Truing Sleeve	3 Adapter For L6 mandrels order L6-A adapter	4 Alignment Bushing	5 Honing Stone
		With Standard Shank Choose One Suffix	With Extra-Long Shank Choose One Suffix		With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
4,70-4,83	.185-.190	BL6-185C S H B	L6-185C S H B	S-185	BL6-A	C-187	See All Stone Tables At Right
4,83-4,95	.190-.195	BL6-190C S H B	L6-190C S H B	S-190	BL6-A	C-190	
4,95-5,08	.195-.200	BL6-195C S H B	L6-195C S H B	S-195	BL6-A	C-195	
5,08-5,21	.200-.205	BL6-200C S H B	L6-200C S H B	S-200	BL6-A	C-200	
5,21-5,33	.205-.210	BL6-205C S H B	L6-205C S H B	S-205	BL6-A	C-205	
5,33-5,46	.210-.215	BL6-210C S H B	L6-210C S H B	S-210	BL6-A	C-210	
5,46-5,59	.215-.220	BL6-215C S H B	L6-215C S H B	S-215	BL6-A	C-215	
5,59-5,71	.220-.225	BL6-220C S H B	L6-220C S H B	S-220	BL6-A	C-220	
5,71-5,84	.225-.230	BL6-225C S H B	L6-225C S H B	S-225	BL6-A	C-225	
5,84-5,97	.230-.235	BL6-230C S H B	L6-230C S H B	S-230	BL6-A	C-230	
5,97-6,10	.235-.240	BL6-235C S H B	L6-235C S H B	S-235	BL6-A	C-235	
6,10-6,22	.240-.245	BL6-240C S H B	L6-240C S H B	S-240	BL6-A	C-240	

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for very fine finishes and honing exotic metals.

Retractable Mandrels

For high production, automation and high stress loads using superabrasive stones. See page 2.86.
NOTE: Available in BLR6+ only.

BL6 Mandrel Replacement Parts

BL6-W Wedge
Replace when wear **begins** to show.
LN-3087C Stone Retainer
LN-3211A Wedge Guide

L6 Mandrel Replacement Parts

L6-W Wedge
Replace when wear **begins** to show.
LN-3590A Stone Retainer
LN-3211A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some applications...plus faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. Available in both BL6 and L6 Mandrels. Select appropriate soft steel mandrel and add -D.+

Example: BL6-185CS-D.+

Carbide Shoe Mandrels+

Two types are available for high-production applications...in either Round Carbide Rod Inserted or Full Carbide Shoe Mandrels. In the correct application they last longer than standard hardened mandrels. When ordering full-carbide type specify starting and finish diameter.

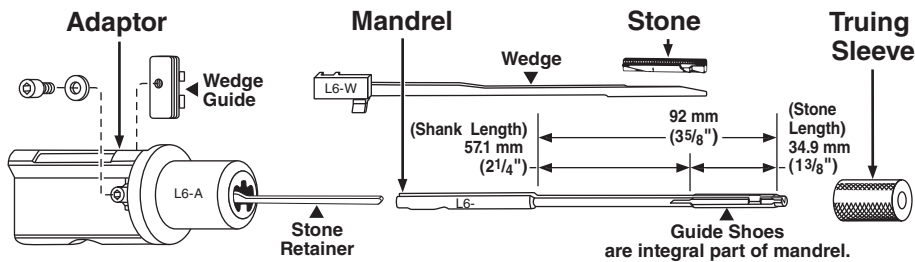
Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Sunnen Honing Units can be used to size two or more "in-line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

+ Special Order - Contact Customer Service



L6 Mandrels are like BL6 Mandrels except the shanks are 25.4 mm (1") longer.
Use only when BL6 is too short

L6 Honing Units

Extra-Long
Shank

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Available Stones		Grit Size											
		70	80	100	150	220	280	320	400	500	600	900	1200
Hard-----Soft	Aluminum Oxide Stones (A) - 12 per box				L6-A43 L6-A45 L6-A47 L6-A49 L6-A413	L6-A55 L6-A57 L6-A59	L6-A61 L6-A63 L6-A65 L6-A67 L6-A69	L6-A75 L6-A77 L6-A79					
	Silicon Carbide Stones (J,C) - 12 per box				L6-J45 L6-J47 L6-J49	L6-J55 L6-J57 L6-J59	L6-J63 L6-J65 L6-J67 L6-J69	L6-J83 L6-J85 L6-J87 L6-J89	L6-J93 L6-J95 L6-J97 L6-J99	L6-C05†			
Hard-----Soft	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitriified (V) Bond - 1 per box				L6-DM35	L6-DM45 L6-DM47	L6-DM55 L6-DM57 L6-DV57 L6-NR53 L6-NMG57	L6-DM65 L6-NM67 L6-NM69	L6-DM85 L6-DM87 L6-DV87 L6-NR83	L6-DM05 L6-DM07 L6-DV07		L6-DM005	L6-DR007
					L6-NM35	L6-NM45 L6-NM47 L6-NM49	L6-NM55 L6-NM57 L6-NM59	L6-NM65 L6-NM67 L6-NM69	L6-NM85 L6-NM87 L6-NM89	L6-NM95 L6-NM97	L6-NM05 L6-NM07	L6-NM905	L6-NM005

†For best results, use with bronze mandrel.

Recommended Stones for BL6 and L6 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin
Deburring: rough holes, all materials						
	L6-A413	—	—	L6-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	L6-J57	1,38	55	L6-DM87	1,25	50
Brass, Soft	L6-J63	0,83	33	L6-J63	0,83	33
Bronze	L6-J57	1,38	55	L6-J57	1,38	55
Carbide	L6-DM57	0,50	20	L6-DM57	0,50	20
Cast Iron	L6-J57	0,50	20	L6-DM57	2,00	80
Ceramic	L6-DM57	1,00	40	L6-DM57	1,00	40
Glass	L6-DM57	1,75	70	L6-DM57	1,75	70
Steel, Soft	L6-A57	0,75	30	L6-NM45	1,25	50
Steel, Hardened*	L6-A55	0,30	12	L6-NM45	1,12	45
Steel, Hardened**	L6-A63	0,30	12	—	—	—
Steel, Very Hard***	L6-NM65	0,70	28	—	—	—
Fine finishing: previously honed holes						
Aluminum	L6-J95	0,30	12	L6-DM07	0,83	33
Brass, Soft	L6-J83	0,40	16	L6-J83	0,40	16
Bronze	L6-J95	0,30	12	L6-J95	0,30	12
Carbide	L6-DM07	0,08	3	L6-DM07	0,08	3
Cast Iron	L6-J95	0,13	5	L6-DM07	0,50	20
Ceramic	L6-DM07	0,38	15	L6-DM07	0,38	15
Glass	L6-DM07	0,38	15	L6-DM07	0,38	15
Steel, Soft	L6-J95	0,10	4	L6-NM05	0,40	16
Steel, Hardened	L6-J83	0,13	5	L6-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

4,57mm - 6,22mm (.180"-.245")

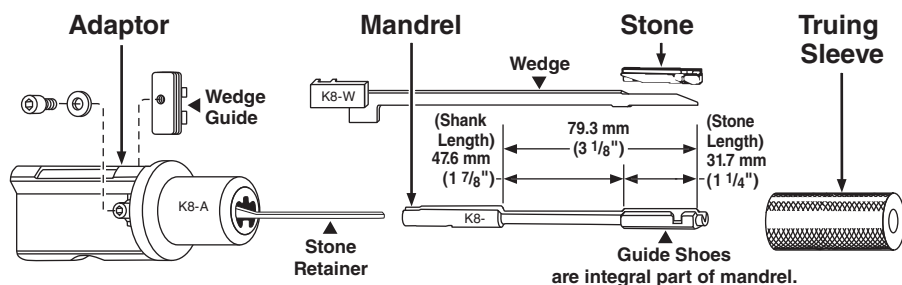
For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter mm in	Diameter Range			
		Low mm in	High mm in	Low mm in	High mm in
ASC-0188	4,76 3/16	4,57 .180	5,05 .199		
ASC-0203	5 13/64	4,85 .191	5,33 .210		
ASC-0219	5,56 7/32	5,36 .211	5,84 .230		
ASC-0234	6 15/64	5,74 .226	6,22 .245		

K8

Honing Units

Diameter Range:
6,22 mm – 7,82 mm
.245" – .308"



Order 1-5 For Complete K8 or J-K8 Honing Units

Diameter Range 6,22 mm - 7,82 mm .245" - .308"		1 K8 Mandrel Includes wedge	1 J-K8 Mandrel Includes wedge	2 Truing Sleeve	3 Adapter For J-K8 mandrels order J-K8-A adapter	4 Alignment Bushing	5 Honing Stone
mm	inches	With Standard Shank Choose One Suffix			With stone retainer and wedge guide	For machines with fully adjustable spindle nose	See All Stone Tables At Right
6,22-6,35	.245-.250	K8-245A	S H B	J-K8-245A	S H	S-245	
6,35-6,48	.250-.255	K8-250A	S H B	J-K8-250A	S H	S-250	
6,48-6,60	.255-.260	K8-255A	S H B	J-K8-255A	S H	S-255	
6,60-6,73	.260-.265	K8-260A	S H B	J-K8-260A	S H	S-260	
6,73-6,86	.265-.270	K8-265A	S H B	J-K8-265A	S H	S-265	
6,86-6,98	.270-.275	K8-270A	S H B	J-K8-270A	S H	S-270	
6,98-7,11	.275-.280	K8-275A	S H B	J-K8-275A	S H	S-275	
7,11-7,24	.280-.285	K8-280A	S H B	J-K8-280A	S H	S-280	
7,24-7,37	.285-.290	K8-285A	S H B	J-K8-285A	S H	S-285	
7,37-7,49	.290-.295	K8-290A	S H B	J-K8-290A	S H	S-290	
7,49-7,62	.295-.300	K8-295A	S H B	J-K8-295A	S H	S-295	
7,62-7,82	.300-.308	K8-300A	S H B	J-K8-300A	S H	S-300	

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrels for very fine finishes and honing exotic metals.
NOTE: J-K8 Mandrels not available in bronze.

Retractable Mandrels

For high production, automation and high stress loads using superabrasive stones. See page 2.86.
NOTE: Available in KR8+ only.

K8 Mandrel Replacement Parts

K8-W Wedge
Replace when wear **begins** to show
LN-3117A Stone Retainer
LN-3211A Wedge Guide

J-K8 Mandrel Replacement Parts

J-K8-W Wedge
Replace when wear **begins** to show
LN-3608A Stone Retainer
LN-3211A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some applications... plus faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. The following mandrels are available from stock: **K8-245ASD**, **K8-250ASD** and **K8-260ASD**. Select appropriate soft steel mandrel and add -D.

Example: K8-265AS-D.

Carbide Shoe Mandrels+

Two types are available for high-production applications...in either Round Carbide Rod Inserted or Full Carbide Shoe Mandrels. In the correct application they last longer than standard hardened mandrels. When ordering full-carbide type specify starting and finish diameter.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

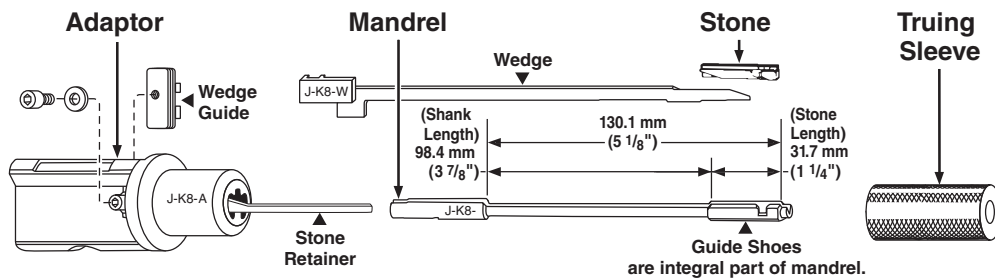
Tandem "In-Line" Mandrels+

Used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

+ Special Order - Contact Customer Service

J-K8 Honing Units

Extra-Long
Shank



J-K8 Mandrels are similar to the K8 Mandrels except the shanks are 50.8 mm (2") longer and should be used only when counterbores will not allow holes to be honed properly with standard K8 Mandrels.

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Available Stones		Grit Size											
		70	80	100	150	220	280	320	400	500	600	900	1200
Soft	Hard	Aluminum Oxide Stones (A) - 12 per box											
					K8-A43	K8-A53	K8-A61						
Soft	Hard	Silicon Carbide Stones (J,C) - 12 per box											
					K8-J45	K8-J55	K8-J63		K8-J83	K8-J93			
Soft	Hard	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vittrified (V) Bond - 1 per box											
				K8-DM35	K8-DMB45	K8-DMB55			K8-DM85		K8-DM05		K8-DR007
Soft	Hard				K8-DM45	K8-DM55			K8-DM87		K8-DM07		K8-DM005
					K8-DM47	K8-DM57			K8-DV87		K8-DV07		
Soft	Hard					K8-NR51							
						K8-NR53			K8-NR83				
Soft	Hard					K8-NMG57							
						K8-NR63							
Soft	Hard				K8-NM35	K8-NM45	K8-NM65		K8-NM85	K8-NM95	K8-NM05	K8-NM905	K8-NM005
					K8-NM39	K8-NM47	K8-NM67		K8-NM87		K8-NM07		
Soft	Hard					K8-NM59	K8-NM69		K8-NM89				

†For best results, use with bronze mandrel.

Recommended Stones for K8 and J-K8 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _A Surface Finish µm µin		Stone to use	Approx. R _A Surface Finish µm µin	
Deburring: rough holes, all materials						
	K8-A413	—	—	K8-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	K8-J57	1,38	55	K8-DM85	1,25	50
Brass, Soft	K8-J63	0,83	33	K8-J63	0,83	33
Bronze	K8-J57	1,38	55	K8-J57	1,38	55
Carbide	K8-DM55	0,50	20	K8-DM55	0,50	20
Cast Iron	K8-J57	0,50	20	K8-DM55	2,00	80
Ceramic	K8-DM55	1,00	40	K8-DM55	1,00	40
Glass	K8-DM55	1,75	70	K8-DM55	1,75	70
Steel, Soft	K8-A57	0,75	30	K8-NM55	1,25	50
Steel, Hardened*	K8-A55	0,30	12	K8-NM55	1,00	40
Steel, Hardened**	K8-A63	0,30	12	—	—	—
Steel, Very Hard***	K8-NM55	1,00	40	—	—	—
Fine finishing: previously honed holes						
Aluminum	K8-J95	0,30	12	K8-DM05	0,83	33
Brass, Soft	K8-J83	0,40	16	K8-J83	0,40	16
Bronze	K8-J95	0,30	12	K8-J95	0,30	12
Carbide	K8-DM05	0,08	3	K8-DM05	0,08	3
Cast Iron	K8-J95	0,13	5	K8-DM05	0,50	20
Ceramic	K8-DM05	0,38	15	K8-DM05	0,38	15
Glass	K8-DM05	0,38	15	K8-DM05	0,38	15
Steel, Soft	K8-J95	0,10	4	K8-NM05	0,40	16
Steel, Hardened	K8-J83	0,13	5	K8-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

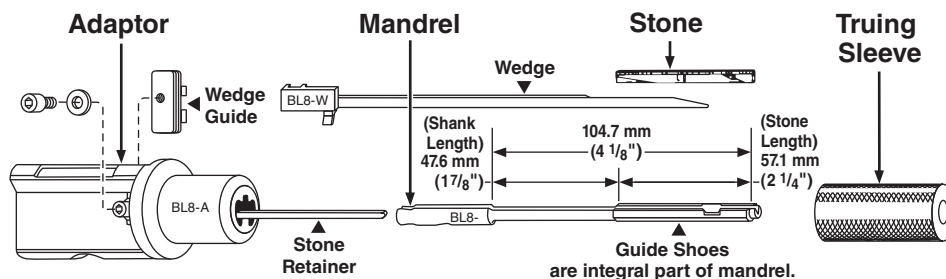
6,10mm - 8,20mm (.240"-.323")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	in	High mm	in
ASC-0250	6,35	1/4	6,10	.240	6,58	.259
ASC-0266	6,75	17/64	6,50	.256	6,99	.275
ASC-0281	7	9/32	6,83	.269	7,32	.288
ASC-0297	7,54	19/64	7,29	.287	7,77	.306
ASC-0312	8	5/16	7,72	.304	8,20	.323

BL8 Honing Units

Diameter Range:
6,22 mm – 7,82 mm
.245" – .308"



Order 1-5 For Complete BL8 or L8 Honing Units

Diameter Range 6,22 mm - 7,82 mm .245" - .308"		1 BL8 Mandrel Includes wedge					1 L8 Mandrel Includes wedge			2 Truing Sleeve		3 Adapter For L8 mandrels order L8-A adapter		4 Alignment Bushing		5 Honing Stone	
mm	inches	With Standard Shank Choose One Suffix					With Extra-Long Shank Choose One Suffix						With stone retainer and wedge guide	For machines with fully adjustable spindle nose			
6,22-6,35	.245-.250	BL8-245A	S	H	B	L8-245A	S	H	B	S-245	BL8-A	C-245		See All Stone Tables At Right			
6,35-6,48	.250-.255	BL8-250A	S	H	B	L8-250A	S	H	B	S-250	BL8-A	C-250					
6,48-6,60	.255-.260	BL8-255A	S	H	B	L8-255A	S	H	B	S-255	BL8-A	C-255					
6,60-6,73	.260-.265	BL8-260A	S	H	B	L8-260A	S	H	B	S-260	BL8-A	C-260					
6,73-6,86	.265-.270	BL8-265A	S	H	B	L8-265A	S	H	B	S-265	BL8-A	C-265					
6,86-6,98	.270-.275	BL8-270A	S	H	B	L8-270A	S	H	B	S-270	BL8-A	C-270					
6,98-7,11	.275-.280	BL8-275A	S	H	B	L8-275A	S	H	B	S-275	BL8-A	C-275					
7,11-7,24	.280-.285	BL8-280A	S	H	B	L8-280A	S	H	B	S-280	BL8-A	C-280					
7,24-7,37	.285-.290	BL8-285A	S	H	B	L8-285A	S	H	B	S-285	BL8-A	C-285					
7,37-7,49	.290-.295	BL8-290A	S	H	B	L8-290A	S	H	B	S-290	BL8-A	C-290					
7,49-7,62	.295-.300	BL8-295A	S	H	B	L8-295A	S	H	B	S-295	BL8-A	C-295					
7,62-7,82	.300-.308	BL8-300A	S	H	B	L8-300A	S	H	B	S-300	BL8-A	C-300					

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrels for very fine finishes and honing exotic metals.

Retractable Mandrels

For high production, automation and high stress loads using superabrasive stones. See page 2.86.
NOTE: Available in BLR8+ only.

BL8 Mandrel Replacement Parts

BL8-W Wedge
 Replace when wear **begins** to show
LN-3117A Stone Retainer
LN-3211A Wedge Guide

L8 Mandrel Replacement Parts

L8-W Wedge
 Replace when wear **begins** to show
LN-3608A Stone Retainer
LN-3211A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some applications...plus faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. The following mandrel is available from stock: **BL8-245AS-D**. Select appropriate soft steel mandrel and add -D.+

Example: BL8-245AS-D.+

Tandem "In-Line" Mandrels+

Sunnen Honing Units can be used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

Carbide Shoe Mandrels+

Two types are available for high-production applications...in either Round Carbide Rod Inserted or Full Carbide Shoe Mandrels. In the correct application they last longer than standard hardened mandrels. When ordering full-carbide type specify starting and finish diameter.

Metal Bond Superabrasive Insert Mandrels+

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with either a hardened or carbide shoe mandrel. Made from a bronze mandrel. Single or double insert mandrels in either Borazon/CBN or diamond are available.

Single Insert BL8-__AB__-JS3X
Double Insert BL8-__AB__-KX1X
 Specify grit size and hardness of insert.

Example: BL8-245AB-NM89-KX1X.

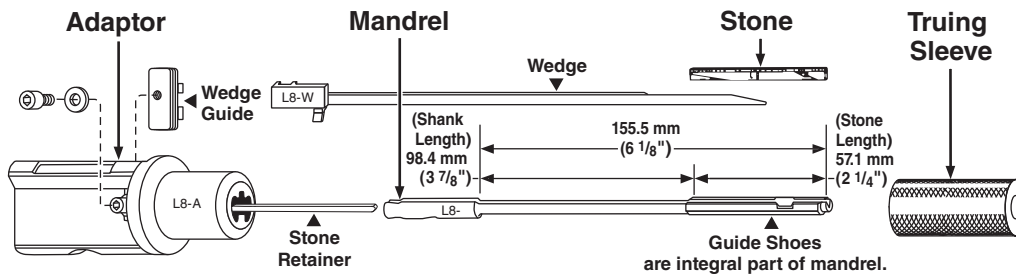
Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

+ Special Order - Contact Customer Service

L8 Honing Units

Extra-Long Shank



L8 Mandrels are like the BL8 Mandrels except the shanks are 50.8 mm (2") longer.
Use only when the BL8 is too short.

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Available Stones		Grit Size											
		70	80	100	150	220	280	320	400	500	600	900	1200
Soft	Hard	Aluminum Oxide Stones (A) - 6 per box											
	Hard				L8-A43 L8-A45 L8-A47 L8-A49 L8-A413	L8-A55 L8-A57 L8-A59	L8-A61 L8-A63 L8-A65 L8-A67 L8-A69	L8-A73 L8-A75 L8-A77 L8-A79					
Soft	Hard	Silicon Carbide Stones (J,C) - 6 per box											
	Hard				L8-J45 L8-J47 L8-J49	L8-J55 L8-J57	L8-J63 L8-J65 L8-J67 L8-J69		L8-J83 L8-J85 L8-J87 L8-J89	L8-J93 L8-J95 L8-J97 L8-J99	L8-C05†		
Soft	Hard	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box											
	Hard			L8-DM35	L8-DM45	L8-DM55 L8-DM57 L8-DV57 L8-NR51 L8-NR53 L8-NMG57			L8-DM85 L8-DM87 L8-DV87 L8-NR83	L8-DM05 L8-DM07 L8-DV07			L8-DR007 L8-DM005
			L8-NM35 L8-NM39	L8-NM45 L8-NM47	L8-NM55 L8-NM57 L8-NM59	L8-NM65 L8-NM67 L8-NM69			L8-NM85 L8-NM87 L8-NM89	L8-NM95	L8-NM05	L8-NM905	L8-NM005

†For best results, use with bronze mandrel.

Recommended Stones for BL8 and L8 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. R_a Surface Finish μm	Approx. R_a Surface Finish μin	Stone to use	Approx. R_a Surface Finish μm	Approx. R_a Surface Finish μin
Deburring: rough holes, all materials						
	L8-A413	—	—	L8-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	L8-J57	1,38	55	L8-DM85	1,25	50
Brass, Soft	L8-J63	0,83	33	L8-J63	0,83	33
Bronze	L8-J57	1,38	55	L8-J57	1,38	55
Carbide	L8-DM55	0,50	20	L8-DM55	0,50	20
Cast Iron	L8-J57	0,50	20	L8-DM55	2,00	80
Ceramic	L8-DM55	1,00	40	L8-DM55	1,00	40
Glass	L8-DM55	1,75	70	L8-DM55	1,75	70
Steel, Soft	L8-A57	0,75	30	L8-NM55	1,25	50
Steel, Hardened*	L8-A55	0,30	12	L8-NM55	1,00	40
Steel, Hardened**	L8-A63	0,30	12	—	—	—
Steel, Very Hard***	L8-NM55	1,00	40	—	—	—
Fine finishing: previously honed holes						
Aluminum	L8-J95	0,30	12	L8-DM05	0,83	33
Brass, Soft	L8-J83	0,40	16	L8-J83	0,40	16
Bronze	L8-J95	0,30	12	L8-J95	0,30	12
Carbide	L8-DM05	0,08	3	L8-DM05	0,08	3
Cast Iron	L8-J95	0,13	5	L8-DM05	0,50	20
Ceramic	L8-DM05	0,38	15	L8-DM05	0,38	15
Glass	L8-DM05	0,38	15	L8-DM05	0,38	15
Steel, Soft	L8-J95	0,10	4	L8-NM05	0,40	16
Steel, Hardened	L8-J83	0,13	5	L8-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

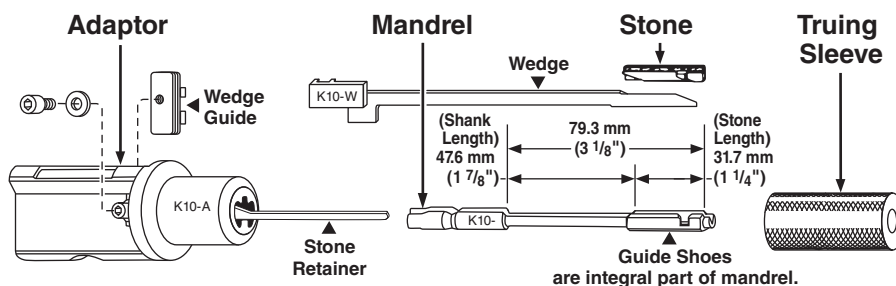
6,10mm - 8,20mm (.240"-.323")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	Low in	High mm	High in
ASC-0250	6,35	1/4	6,10	.240	6,58	.259
ASC-0266	6,75	17/64	6,50	.256	6,99	.275
ASC-0281	7	9/32	6,83	.269	7,32	.288
ASC-0297	7,54	19/64	7,29	.287	7,77	.306
ASC-0312	8	5/16	7,72	.304	8,20	.323

K10 Honing Units

Diameter Range:
7,82 mm – 9,40 mm
.308" – .370"



Order 1-5 For Complete K10 or J-K10 Honing Units

Diameter Range 7,82 mm - 9,40 mm .308" - .370"		1 K10 Mandrel Includes wedge				1 J-K10 Mandrel Includes wedge				2 Truing Sleeve		3 Adapter For J-K10 mandrels order J-K10-A adapter		4 Alignment Bushing		5 Honing Stone	
mm	inches	With Standard Shank				With Extra-Long Shank					With stone retainer and wedge guide	With stone retainer and wedge guide	For machines with fully adjustable spindle nose				
		Choose One Suffix				Choose One Suffix											
7,82-8,03	.308-.316	K10-308A	S	H	B	J-K10-308A	S	H		S-308	K10-A	C-308	See All Stone Tables At Right				
7,90-8,11	.311-3.19	K10-8MMA	NA	H	NA	N/A	NA	NA		S-8MM	K10-A	C-8MM					
8,03-8,20	.316-.323	K10-316A	S	H	B	J-K10-316A	S	H		S-316	K10-A	C-316					
8,20-8,41	.323-.331	K10-323A	S	H	B	J-K10-323A	S	H		S-323	K10-A	C-323					
8,41-8,61	.331-.339	K10-331A	S	H	B	J-K10-331A	S	H		S-331	K10-A	C-331					
8,61-8,81	.339-.347	K10-339A	S	H	B	J-K10-339A	S	H		S-339	K10-A	C-339					
8,81-8,99	.347-.354	K10-347A	S	H	B	J-K10-347A	S	H		S-347	K10-A	C-347					
8,99-9,19	.354-.362	K10-354A	S	H	B	J-K10-354A	S	H		S-354	K10-A	C-354					
9,19-9,40	.362-.370	K10-362A	S	H	B	J-K10-362A	S	H		S-362	K10-A	C-362					

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for very fine finishes and honing exotic metals. NOTE: J-K10 Mandrels not available in bronze.*

Retractable Mandrels

For high production, automation and high stress loads using superabrasive stones. See page 2.86.
NOTE: Available in KR10+ only.

K10 Mandrel Replacement Parts

K10-W Wedge
Replace when wear *begins* to show
LN-3117A Stone Retainer
LN-3211A Wedge Guide

J-K10 Mandrel Replacement Parts

J-K10-W Wedge
Replace when wear *begins* to show
LN-3608A Stone Retainer
LN-3211A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some applications...plus faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond.

The following mandrels are available from stock: **K10-308ASD**, and **K10-362ASD**. Select appropriate soft steel mandrel and add -D.*

Example: K10-331AS-D.*

Carbide Shoe Mandrels+

Two types are available for high-production applications...in either Round Carbide Rod Inserted or Full Carbide Shoe Mandrels. In the correct application they last longer than standard hardened mandrels. When ordering full-carbide type specify starting and finish diameter.

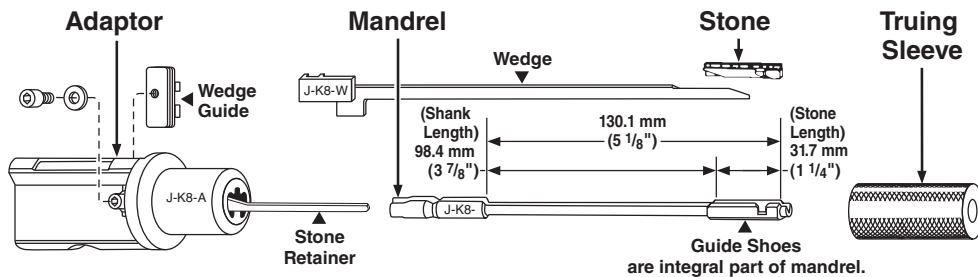
Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

* Special Order - Contact Customer Service



J-K10 Honing Units

Extra-Long
Shank

J-K10 Mandrels are similar to the K10 Mandrels except the shanks are 50.8 mm (2") longer and should be used only when counterbores will not allow holes to be honed properly with standard K10 Mandrels.

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Available Stones		Grit Size											
		70	80	100	150	220	280	320	400	500	600	900	1200
Soft	Hard	Aluminum Oxide Stones (A) - 12 per box											
					K10-A43 K10-A45 K10-A47 K10-A49 K10-A413	K10-A55 K10-A57 K10-A59	K10-A61 K10-A63 K10-A65 K10-A67 K10-A69	K10-A75 K10-A77 K10-A79					
Soft	Hard	Silicon Carbide Stones (J,C) - 12 per box											
					K10-J45 K10-J47 K10-J49	K10-J55 K10-J57 K10-J59	K10-J63 K10-J65 K10-J67 K10-J69	K10-J83 K10-J85 K10-J87 K10-J89	K10-J93 K10-J95 K10-J97 K10-J99	K10-C05†			
Soft	Hard	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box											
			K10-DM35	K10-DMB45 K10-DM45 K10-DM47	K10-DM55 K10-DM57			K10-DM85 K10-DM87		K10-DM05 K10-DM07			K10-DR007 K10-DM005
					K10-DV57			K10-DV87		K10-DV07			
					K10-NR51 K10-NR53			K10-NR83					
		K10-NM35	K10-NM45 K10-NM47	K10-NM55 K10-NMG57	K10-NM65			K10-NM85	K10-NM95	K10-NM05 K10-NM07	K10-NM905	K10-NM005	
		K10-NM39	K10-NM49	K10-NM57 K10-NM59	K10-NM67 K10-NM69			K10-NM87 K10-NM89					

†For best results, use with bronze mandrel.

Recommended Stones for K10 and J-K10 Mandrels

Material	Low-Volume		High-Volume	
	Stone to use	Approx. R _a µm µin	Stone to use	Approx. R _a µm µin
Deburring: rough holes, all materials				
	K10-A413	—	K10-A413	—
Fast removal: deburred, bored, ground, reamed holes				
Aluminum	K10-J57	1,38 55	K10-DM85	1,25 50
Brass, Soft	K10-J63	0,83 33	K10-J63	0,83 33
Bronze	K10-J57	1,38 55	K10-J57	1,38 55
Carbide	K10-DM55	0,50 20	K10-DM55	0,50 20
Cast Iron	K10-J57	0,50 20	K10-DM55	2,00 80
Ceramic	K10-DM55	1,00 40	K10-DM55	1,00 40
Glass	K10-DM55	1,75 70	K10-DM55	1,75 70
Steel, Soft	K10-A57	0,75 30	K10-NM55	1,25 50
Steel, Hardened*	K10-A55	0,30 12	K10-NM55	1,00 40
Steel, Hardened**	K10-A63	0,30 12	—	—
Steel, Very Hard***	K10-NM55	1,00 40	—	—
Fine finishing: previously honed holes				
Aluminum	K10-J95	0,30 12	K10-DM05	0,83 33
Brass, Soft	K10-J83	0,40 16	K10-J83	0,40 16
Bronze	K10-J95	0,30 12	K10-J95	0,30 12
Carbide	K10-DM05	0,08 3	K10-DM05	0,08 3
Cast Iron	K10-J95	0,13 5	K10-DM05	0,50 20
Ceramic	K10-DM05	0,38 15	K10-DM05	0,38 15
Glass	K10-DM05	0,38 15	K10-DM05	0,38 15
Steel, Soft	K10-J95	0,10 4	K10-NM05	0,40 16
Steel, Hardened	K10-J83	0,13 5	K10-NM05	0,18 7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

7,72mm - 9,75mm (.304"-.384")

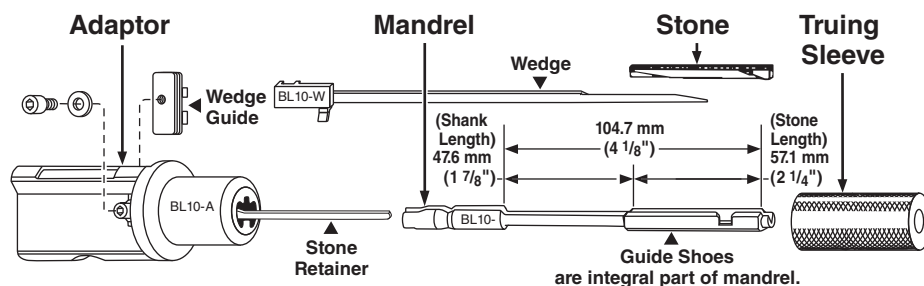
For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low	High	mm	in
ASC-0312	8	5/16	7,72	.304	8,20	.323
ASC-0328	8,33	21/64	8,08	.318	8,56	.337
ASC-0344	8,73	11/32	8,48	.334	8,97	.353
ASC-0359	9	23/64	8,81	.347	9,30	.366
ASC-0375	9,53	3/8	9,27	.365	9,75	.384

BL10

Honing Units

Diameter Range:
7,82 mm – 9,40 mm
.308" – .370"



Order 1-5 For Complete BL10 or L10 Honing Units

Diameter Range 7,82 mm - 9,40 mm .308" - .370"		<div>1</div> BL10 Mandrel Includes wedge				<div>1</div> L10 Mandrel Includes wedge				<div>2</div> Truing Sleeve		<div>3</div> Adapter For L10 mandrels order L10-A adapter		<div>4</div> Alignment Bushing		<div>5</div> Honing Stone	
mm	inches	With Standard Shank				With Extra-Long Shank					With stone retainer and wedge guide	For machines with fully adjustable spindle nose					
		Choose One Suffix				Choose One Suffix											
7,82-8,03	.308-.316	BL10-308A	S	H	B	L10-308A	S	H	B	S-308	BL10-A	C-308	See All Stone Tables At Right				
8,03-8,20	.316-.323	BL10-316A	S	H	B	L10-316A	S	H	B	S-316	BL10-A	C-316					
8,20-8,41	.323-.331	BL10-323A	S	H	B	L10-323A	S	H	B	S-323	BL10-A	C-323					
8,41-8,61	.331-.339	BL10-331A	S	H	B	L10-331A	S	H	B	S-331	BL10-A	C-331					
8,61-8,81	.339-.347	BL10-339A	S	H	B	L10-339A	S	H	B	S-339	BL10-A	C-339					
8,81-8,99	.347-.354	BL10-347A	S	H	B	L10-347A	S	H	B	S-347	BL10-A	C-347					
8,99-9,19	.354-.362	BL10-354A	S	H	B	L10-354A	S	H	B	S-354	BL10-A	C-354					
9,19-9,40	.362-.370	BL10-362A	S	H	B	L10-362A	S	H	B	S-362	BL10-A	C-362					

See All
Stone
Tables
At Right

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrels for very fine finishes and honing exotic metals.*

Retractable Mandrels

For high production, automation and high stress loads using superabrasive stones. See page 2.86.
NOTE: Available in BLR10+ only.

BL10 Mandrel Replacement Parts

BL10-W Wedge
Replace when wear *begins* to show
LN-3117A Stone Retainer
LN-3211A Wedge Guide

L10 Mandrel Replacement Parts

L10-W Wedge
Replace when wear *begins* to show
LN-3608A Stone Retainer
LN-3211A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some applications...plus faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. The following mandrel is available from stock:
BL10-308AS-D. Select appropriate soft steel mandrel and add -D.*

Example: BL8-308AS-D. BL10-316AS-D.*

Carbide Shoe Mandrels+

Two types are available for high-production applications...in either Round Carbide Rod Inserted or Full Carbide Shoe Mandrels. In the correct application they last longer than standard hardened mandrels. When ordering full-carbide type specify starting and finish diameter.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Metal Bond Superabrasive Insert Mandrels+

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with either a hardened or carbide shoe mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

Single Insert BL10-___AB___-JS3X
Double Insert BL10-___AB___-KX1X

Specify grit size and hardness of insert.

Example: BL10-308AB-NM89-KX1X

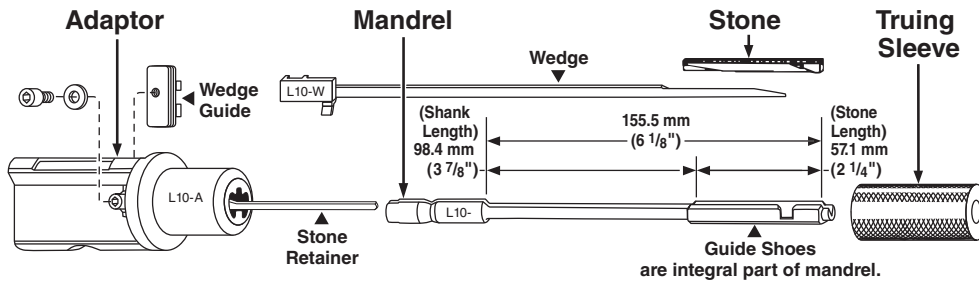
Tandem "In-Line" Mandrels+

Sunnen Honing Units can be used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

* Special Order - Contact Customer Service

L10 Honing Units

Extra-Long Shank



L10 Mandrels are like BL6 Mandrels except the shanks are 50.8 mm (2") longer.
Use only when BL10 is too short

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

		Available Stones											
		Grit Size											
		70	80	100	150	220	280	320	400	500	600	900	1200
Hard-----Soft		Aluminum Oxide Stones (A) - 6 per box											
				L10-A43 L10-A45 L10-A47 L10-A49 L10-A413	L10-A55 L10-A57 L10-A59	L10-A61 L10-A63 L10-A65 L10-A67 L10-A69	L10-A75 L10-A77 L10-A79						
Hard--Soft		Silicon Carbide Stones (J,C) - 6 per box											
				L10-J45 L10-J47 L10-J49	L10-J55 L10-J57 L10-J59	L10-J63 L10-J65 L10-J67 L10-J69		L10-J83 L10-J85 L10-J87 L10-J89	L10-J93 L10-J95 L10-J97 L10-J99	L10-C05†			
Hard-----Soft		Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box											
			L10-DM35	L10-DMB45 L10-DM45	L10-DM55 L10-DM57 L10-DV57 L10-NR51 L10-NR53			L10-DM85 L10-DM87 L10-DV87 L10-NR83		L10-DM05 L10-DM07 L10-DV07		L10-DR007 L10-DM005	
			L10-NM35 L10-NM39	L10-NM45 L10-NM47	L10-NMG57 L10-NM55 L10-NM57 L10-NM59	L10-NM65 L10-NM67		L10-NM85 L10-NM87	L10-NM95	L10-NM05	L10-NM905	L10-NM005	

†For best results, use with bronze mandrel.

Recommended Stones for BL10 and L10 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin
Deburring: rough holes, all materials						
	L10-A413	—	—	L10-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	L10-J57	1,38	55	L10-DM85	1,25	50
Brass, Soft	L10-J63	0,83	33	L10-J63	0,83	33
Bronze	L10-J57	1,38	55	L10-J57	1,38	55
Carbide	L10-DM55	0,50	20	L10-DM55	0,50	20
Cast Iron	L10-J57	0,50	20	L10-DM55	2,00	80
Ceramic	L10-DM55	1,00	40	L10-DM55	1,00	40
Glass	L10-DM55	1,75	70	L10-DM55	1,75	70
Steel, Soft	L10-A57	0,75	30	L10-NM55	1,25	50
Steel, Hardened*	L10-A55	0,30	12	L10-NM55	1,00	40
Steel, Hardened**	L10-A63	0,30	12	—	—	—
Steel, Very Hard***	L10-NM55	1,00	40	—	—	—
Fine finishing: previously honed holes						
Aluminum	L10-J95	0,30	12	L10-DM05	0,83	33
Brass, Soft	L10-J83	0,40	16	L10-J83	0,40	16
Bronze	L10-J95	0,30	12	L10-J95	0,30	12
Carbide	L10-DM05	0,08	3	L10-DM05	0,08	3
Cast Iron	L10-J95	0,13	5	L10-DM05	0,50	20
Ceramic	L10-DM05	0,38	15	L10-DM05	0,38	15
Glass	L10-DM05	0,38	15	L10-DM05	0,38	15
Steel, Soft	L10-J95	0,10	4	L10-NM05	0,40	16
Steel, Hardened	L10-J83	0,13	5	L10-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

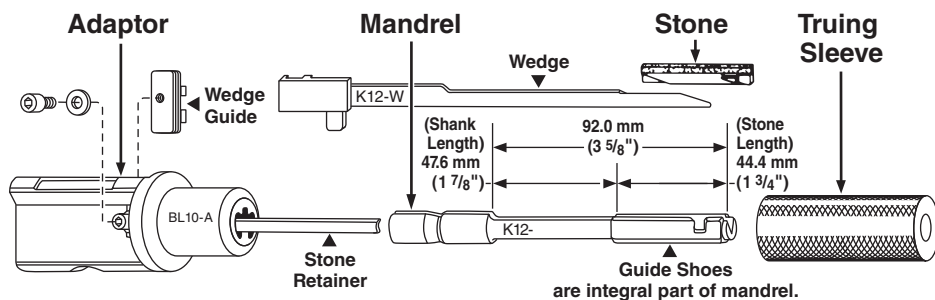
7,72mm - 9,75mm (.304"-.334")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	Low in	High mm	High in
ASC-0312	8	5/16	7,72	.304	8,20	.323
ASC-0328	8,33	21/64	8,08	.318	8,56	.337
ASC-0344	8,73	11/32	8,48	.334	8,97	.353
ASC-0359	9	23/64	8,81	.347	9,30	.366
ASC-0375	9,53	3/8	9,27	.365	9,75	.384

K12 Honing Units

Diameter Range:
9,40 mm – 12,57 mm
.370" – .495"



Order 1-5 For Complete K12 or J-K12 Honing Units

Diameter Range 9,40 mm - 12,57 mm .370" - .495"		1 K12 Mandrel Includes wedge				1 J-K12 Mandrel Includes wedge				2 Truing Sleeve		3 Adapter For J-K12 mandrels order J-K12-A adapter		4 Alignment Bushing		5 Honing Stone	
mm	inches	With Standard Shank Choose One Suffix				With Extra-Long Shank Choose One Suffix					With stone retainer and wedge guide	For machines with fully adjustable spindle nose					
9,40-9,78	.370-.385	K12-370A	S	H	B	J-K12-370A	S	H		S-370	K12-A	C-370	See All Stone Tables At Right				
9,78-10,16	.385-.400	K12-385A	S	H	B	J-K12-385A	S	H		S-385	K12-A	C-385					
9,90-10,28	.389-.405	K12-10MMA	—	H	—	N/A	NA	NA		S-10MM	K12-A	C-10MM					
10,16-10,57	.400-.416	K12-400A	S	H	B	J-K12-400A	S	H		S-400	K12-A	C-400					
10,57-10,97	.416-.432	K12-416A	S	H	B	J-K12-416A	S	H		S-416	K12-A	C-416					
10,97-11,35	.432-.447	K12-432A	S	H	B	J-K12-432A	S	H		S-432	K12-A	C-432					
11,35-11,76	.447-.463	K12-447A	S	H	B	J-K12-447A	S	H		S-447	K12-A	C-447					
11,76-12,17	.463-.479	K12-463A	S	H	B	J-K12-463A	S	H		S-463	K12-A	C-463					
11,90-12,31	.468-.485	K12-12MMA	—	H	—	N/A	NA	NA		S-12MM	K12-A	C-12MM					
12,17-12,57	.479-.495	K12-479A	S	H	B	J-K12-479A	S	H		S-479	K12-A	C-479					

See All
Stone
Tables
At Right

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrels for very fine finishes and honing exotic metals.
NOTE: J-K12 Mandrels not available in bronze.

Retractable Mandrels

For high production, automation and high stress loads using superabrasive stones. See page 2.86.
NOTE: Available in KR12+ only.

K12 Mandrel Replacement Parts

K12-W Wedge
Replace when wear **begins** to show
LN-3167A Stone Retainer
LN-3214A Wedge Guide

J-K12 Mandrel Replacement Parts

J-K12-W Wedge
Replace when wear **begins** to show
LN-3702A Stone Retainer
LN-3214A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some applications...plus faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond.

The following mandrels are available from stock: **K12-370ASD**, **K12-385ASD**, **K12-400ASD**, **K12-432ASD**, **K12-463ASD**. Select appropriate soft steel mandrel and add -D.+

Example: K12-416AS-D.+

Carbide Shoe Mandrels+

Two types are available for high-production applications...in either Round Carbide Rod Inserted or Full Carbide Shoe Mandrels. In the correct application they last longer than standard hardened mandrels. When ordering full-carbide type specify starting and finish diameter.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Multi-Stone Honing Units+

Available in 2, 3, 4 or 5 stone lengths, these mandrels can solve problems when honing multiland bores, long bores needing bow removal or long bores machined from both ends. All mandrels are soft steel with integral shoes. Carbide, stone-inserted, or diamond plated (220 grit) guide shoes are available for extended mandrel life.

Tandem "In-Line" Mandrels+

Used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

Metal Bond Superabrasive Insert Mandrels+

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with either a hardened or carbide shoe mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

Single Insert Mandrel

K12-__AB__-JS3X

Double Insert Mandrel

K12-__AB__-KX1X

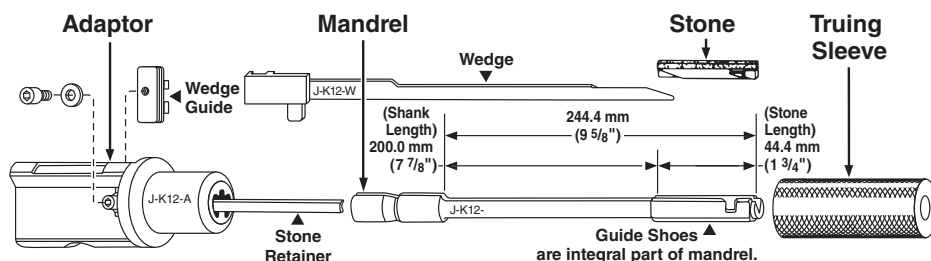
Specify grit size and hardness of insert.

Example: K12-370AB-NM89-KX1X

+ Special Order - Contact Customer Service

J-K12 Honing Units

Extra-Long
Shank



J-K12 Mandrels are similar to the K12 Mandrels except the shanks are 152.4 mm (6") longer and should be used only when counterbores will not allow holes to be honed properly with standard K12 Mandrels.

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Available Stones

Available Stones		Grit Size												
		70	80	100	150	220	280	320	400	500	600	900	1200	
Hard-----Soft	Aluminum Oxide Stones (A) - 12 per box													
				K12-A43 K12-A45 K12-A47	K12-A55	K12-A61 K12-A63 K12-A65	K12-A75							
				K12-A49 K12-A411 K12-A413	K12-A57 K12-A5701A K12-A59	K12-A67 K12-A69	K12-A77 K12-A79							
Hard-----Soft	Silicon Carbide Stones (J,C) - 12 per box													
				K12-J45 K12-J47 K12-J49	K12-J55	K12-J63 K12-J65		K12-J83 K12-J85 K12-J8501A K12-J87 K12-J8701A K12-J89	K12-J93 K12-J95	K12-C05†				
					K12-J57 K12-J5701A K12-J59	K12-J67 K12-J69			K12-J97 K12-J99					
Hard-----Soft	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box													
		K12-DM35	K12-DMB45 K12-DM45 K12-DM47	K12-DMB55 K12-DM55 K12-DM57			K12-DM85 K12-DM87		K12-DM05 K12-DM07			K12-DR007 K12-DM005		
			K12-DV47	K12-DV57			K12-DV87		K12-DV07					
				K12-NR51 K12-NR53 K12-NMG57			K12-NR83							
	K12-NM35 K12-NM37 K12-NM39	K12-NM45 K12-NM47	K12-NM55 K12-NM57 K12-NM59	K12-NM65 K12-NM67 K12-NM69		K12-NM85 K12-NM87 K12-NM89	K12-NM95	K12-NM05 K12-NM07	K12-NM905	K12-NM005				

†For best results, use with bronze mandrel.

Recommended Stones for K12 and J-K12 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin
Deburring: rough holes, all materials						
	K12-A413	—	—	K12-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	K12-J57	1,38	55	K12-DM85	1,25	50
Brass, Soft	K12-J63	0,83	33	K12-J63	0,83	33
Bronze	K12-J57	1,38	55	K12-J57	1,38	55
Carbide	K12-DM55	0,50	20	K12-DM55	0,50	20
Cast Iron	K12-J57	0,50	20	K12-DM55	2,00	80
Ceramic	K12-DM55	1,00	40	K12-DM55	1,00	40
Glass	K12-DM55	1,75	70	K12-DM55	1,75	70
Steel, Soft	K12-A57	0,75	30	K12-NM55	1,25	50
Steel, Hardened*	K12-A55	0,30	12	K12-NM55	1,00	40
Steel, Hardened**	K12-A63	0,30	12	—	—	—
Steel, Very Hard***	K12-NM55	1,00	40	—	—	—
Fine finishing: previously honed holes						
Aluminum	K12-J95	0,30	12	K12-DM05	0,83	33
Brass, Soft	K12-J83	0,40	16	K12-J83	0,40	16
Bronze	K12-J95	0,30	12	K12-J95	0,30	12
Carbide	K12-DM05	0,08	3	K12-DM05	0,08	3
Cast Iron	K12-J95	0,13	5	K12-DM05	0,50	20
Ceramic	K12-DM05	0,38	15	K12-DM05	0,38	15
Glass	K12-DM05	0,38	15	K12-DM05	0,38	15
Steel, Soft	K12-J95	0,10	4	K12-NM05	0,40	16
Steel, Hardened	K12-J83	0,13	5	K12-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

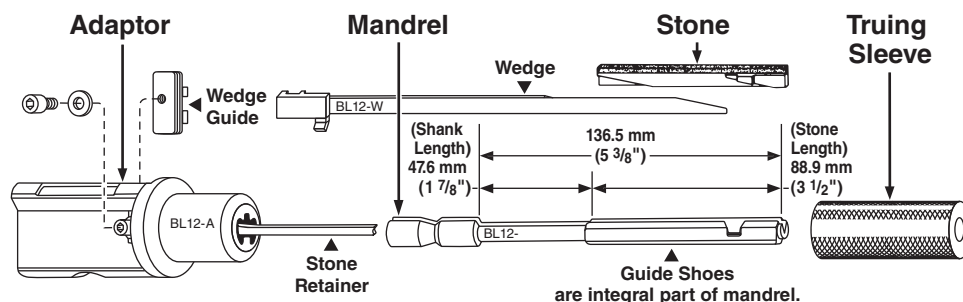
9,27mm - 12,52mm (.365"-.509")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low		High	
			mm	in	mm	in
ASC-0375	9,53	3/8	9,27	.365	9,75	.384
ASC-0391	10	25/64	9,73	.383	10,21	.402
ASC-0406	10,32	13/32	10,06	.396	10,54	.415
ASC-0422	10,72	27/64	10,47	.412	10,95	.431
ASC-0438	11	7/16	10,82	.426	11,30	.445
ASC-0453	11,51	29/64	11,25	.443	11,74	.462
ASC-0469	12	15/32	11,71	.461	12,19	.480
ASC-0484	12,3	31/64	12,04	.474	12,52	.493
ASC-0500	12,7	1/2	12,45	.490	12,93	.509

BL12 Honing Units

Diameter Range:
9,40 mm – 12,57 mm
.370" – .495"



Order 1-5 For Complete BL12 or L12 Honing Units

Diameter Range 9,40 mm - 12,57 mm .370" - .495"		1 BL12 Mandrel Includes wedge				1 L12 Mandrel Includes wedge				2 Truing Sleeve		3 Adapter For L12 mandrels order L12-A adapter		4 Alignment Bushing		5 Honing Stone	
mm	inches	With Standard Shank				With Extra-Long Shank					With stone retainer and wedge guide	For machines with fully adjustable spindle nose					
		Choose One Suffix				Choose One Suffix											
9,40-9,78	.370-.385	BL12-370A	S	H	B	L12-370A	S	H	B	S-370	BL12-A		C-370	See All Stone Tables At Right			
9,78-10,16	.385-.400	BL12-385A	S	H	B	L12-385A	S	H	B	S-385	BL12-A		C-385				
10,16-10,57	.400-.416	BL12-400A	S	H	B	L12-400A	S	H	B	S-400	BL12-A		C-400				
10,57-10,97	.416-.432	BL12-416A	S	H	B	L12-416A	S	H	B	S-416	BL12-A		C-416				
10,97-11,35	.432-.447	BL12-432A	S	H	B	L12-432A	S	H	B	S-432	BL12-A		C-432				
11,35-11,76	.447-.463	BL12-447A	S	H	B	L12-447A	S	H	B	S-447	BL12-A		C-447				
11,76-12,17	.463-.479	BL12-463A	S	H	B	L12-463A	S	H	B	S-463	BL12-A		C-463				
12,17-12,57	.479-.495	BL12-479A	S	H	B	L12-479A	S	H	B	S-479	BL12-A		C-479				

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes, for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrels for producing very fine finishes and honing exotic metals.*

Retractable Mandrels

For high production, automation and high stress loads using superabrasive stones. See page 2.86.

BL12 Mandrel Replacement Parts

BL12-W Wedge
Replace when wear *begins* to show
LN-3167A Stone Retainer
LN-3214A Wedge Guide

L12 Mandrel Replacement Parts

L12-W Wedge
Replace when wear *begins* to show
LN-3658A Stone Retainer
LN-3214A Wedge Guide

Diamond Plated Super Mandrels*

Designed to provide a long-wearing guide shoe to increase mandrel life in some applications...plus faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. The following mandrels available from stock:
BL12-370ASD, L12-370ASD, BL12-432ASD.
Select appropriate soft steel mandrel and add -D.*

Example: BL12-385AS-D.*

Carbide Shoe Mandrels*

Two types are available for high-production applications...in either Round Carbide Rod Inserted or Full Carbide Shoe Mandrels. In the correct application they last longer than standard hardened mandrels. When ordering full-carbide type specify starting and finish diameter.

Extended Shank Mandrels*

Available for honing parts that are too long to be honed with a standard mandrel.

Metal Bond Superabrasive Insert Mandrels*

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with either a hardened or carbide shoe mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

Single Insert BL12-__AB__-JS3X
Double Insert BL12-__AB__-KX1X

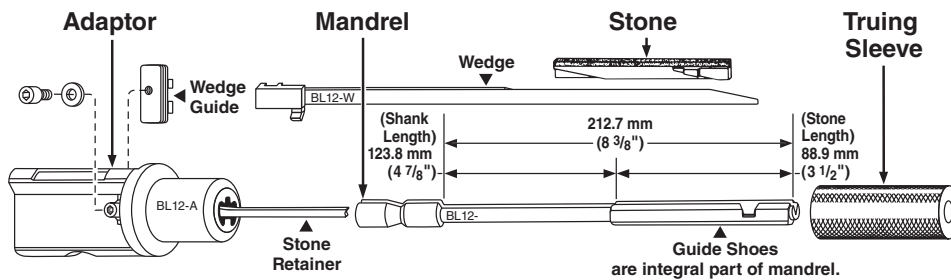
Specify grit size and hardness of insert.

Example: BL12-370AB-NM89-KX1X

Tandem "In-Line" Mandrels*

Sunnen Honing Units can be used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

* Special Order - Contact Customer Service



L12 Mandrels are like the BL12 Mandrels except the shanks are 76.2 mm (3") longer.
Use only when the BL12 is too short.

L12

Honing Units

Extra-Long Shank

In some cases, stones other than the **RECOMMENDED STONES** may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Available Stones													
		Grit Size											
		70	80	100	150	220	280	320	400	500	600	900	1200
Hard-----Soft	Aluminum Oxide Stones (A) - 6 per box												
				L12-A43 L12-A45 L12-A47	L12-A55 L12-A57	L12-A61 L12-A63 L12-A65 L12-A67	L12-A75 L12-A77						
				L12-A49 L12-A413	L12-A59	L12-A69	L12-A79						
Hard-----Soft	Silicon Carbide Stones (J,C) - 6 per box												
				L12-J45	L12-J55	L12-J63 L12-J65		L12-J83 L12-J85	L12-J93 L12-J95	L12-C05†			
				L12-J47	L12-J57	L12-J67		L12-J87	L12-J97				
			L12-J49	L12-J59	L12-J69		L12-J89	L12-J99					
Hard-----Soft	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box												
			L12-DM35	L12-DMB45 L12-DM45	L12-DM55 L12-DM57 L12-DV57			L12-DM85 L12-DM87 L12-DV87		L12-DM05 L12-DV07		L12-DR007 L12-DM005	
			L12-NM35 L12-NM39	L12-NM45 L12-NM47	L12-NR51 L12-NR53 L12-NMG57 L12-NM55 L12-NM57 L12-NM59	L12-NM65 L12-NM67 L12-NM69		L12-NR83 L12-NM85 L12-NM87	L12-NM95	L12-NM05	L12-NM905	L12-NM005	

†For best results, use with bronze mandrel.

Recommended Stones for BL12 and L12 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin
Deburring: rough holes, all materials						
	L12-A413	—	—	L12-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	L12-J57	1,38	55	L12-DM85	1,25	50
Brass, Soft	L12-J63	0,83	33	L12-J63	0,83	33
Bronze	L12-J57	1,38	55	L12-J57	1,38	55
Carbide	L12-DM55	0,50	20	L12-DM55	0,50	20
Cast Iron	L12-J57	0,50	20	L12-DM55	2,00	80
Ceramic	L12-DM55	1,00	40	L12-DM55	1,00	40
Glass	L12-DM55	1,75	70	L12-DM55	1,75	70
Steel, Soft	L12-A57	0,75	30	L12-NM55	1,25	50
Steel, Hardened*	L12-A55	0,30	12	L12-NM55	1,00	40
Steel, Hardened**	L12-A63	0,30	12	—	—	—
Steel, Very Hard***	L12-NM55	1,00	40	—	—	—
Fine finishing: previously honed holes						
Aluminum	L12-J95	0,30	12	L12-DM05	0,83	33
Brass, Soft	L12-J83	0,40	16	L12-J83	0,40	16
Bronze	L12-J95	0,30	12	L12-J95	0,30	12
Carbide	L12-DM05	0,08	3	L12-DM05	0,08	3
Cast Iron	L12-J95	0,13	5	L12-DM05	0,50	20
Ceramic	L12-DM05	0,38	15	L12-DM05	0,38	15
Glass	L12-DM05	0,38	15	L12-DM05	0,38	15
Steel, Soft	L12-J95	0,10	4	L12-NM05	0,40	16
Steel, Hardened	L12-J83	0,13	5	L12-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

9,27mm - 12,52mm (.365"-.509")

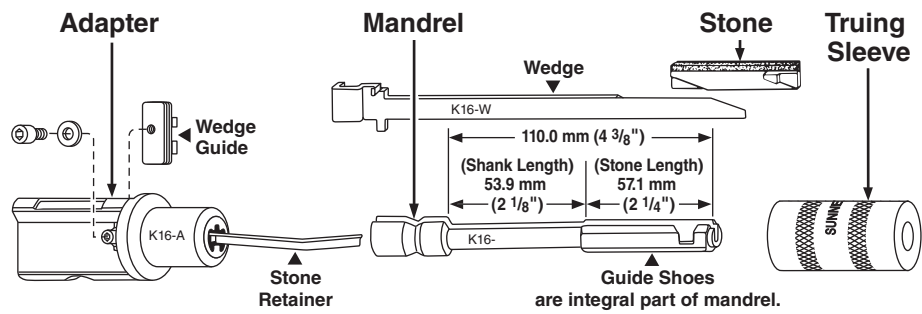
For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	Low in	High mm	High in
ASC-0375	9,53	3/8	9,27	.365	9,75	.384
ASC-0391	10	25/64	9,73	.383	10,21	.402
ASC-0406	10,32	13/32	10,06	.396	10,54	.415
ASC-0422	10,72	27/64	10,47	.412	10,95	.431
ASC-0438	11	7/16	10,82	.426	11,30	.445
ASC-0453	11,51	29/64	11,25	.443	11,74	.462
ASC-0469	12	15/32	11,71	.461	12,19	.480
ASC-0484	12,3	31/64	12,04	.474	12,52	.493
ASC-0500	12,7	1/2	12,45	.490	12,93	.509

K16

Honing Units

Diameter Range:
12,57 mm – 15,72 mm
.495" – .619"



Order 1-5 For Complete K16 or J-K16 Honing Units

Diameter Range 12,57 mm - 15,72 mm .495" - .619"		1 K16 Mandrel Includes wedge			1 J-K16 Mandrel Includes wedge			2 Truing Sleeve		3 Adapter For J-K16 mandrels order J-K16-A adapter		4 Alignment Bushing		5 Honing Stone	
mm	inches	With Standard Shank Choose One Suffix			With Extra-Long Shank Choose One Suffix				With stone retainer and wedge guide	For machines with fully adjustable spindle nose					
12,57-13,36	.495-.526	K16-495A	S	H	B	J-K16-495A	S	H	S-495	K16-A	C-495	See All Stone Tables At Right Most stones in parentheses available 2 weeks after receipt of order.			
13,36-14,15	.526-.557	K16-526A	S	H	B	J-K16-526A	S	H	S-526	K16-A	C-526				
13,90-14,69	.547-.578	K16-14MMA	NA	H	NA	N/A	NA	NA	S-14MM	K16-A	C-14MM				
14,15-14,94	.557-.588	K16-557A	S	H	B	J-K16-557A	S	H	S-557	K16-A	C-557				
14,94-15,72	.588-.619	K16-588A	S	H	B	J-K16-588A	S	H	S-588	K16-A	C-588				

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for producing very fine finishes and honing exotic metals.
NOTE: J-K16 Mandrels not available in bronze.

Retractable Mandrels

For high production, automation and high stress loads using superabrasive stones. See page 2.86.
NOTE: Available in KR16+ only.

K16 Mandrel Replacement Parts

K16-W Wedge
 Replace when wear **begins** to show
LN-3686A Stone Retainer
LN-3217A Wedge Guide

J-K16 Mandrel Replacement Parts

J-K16-W Wedge
 Replace when wear **begins** to show
LN-3703A Stone Retainer
LN-3217A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some applications...plus faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond.

The following mandrels are available from stock: **K16-495ASD**, **K16-557ASD**, **K16-588ASD**. Select appropriate soft steel mandrel and add -D+.

Example: K16-526AS-D+.

Carbide Shoe Mandrels+

Two types are available for high-production applications...in either Round Carbide Rod Inserted or Full Carbide Shoe Mandrels. In the correct application they last longer than standard hardened mandrels. When ordering full-carbide type specify starting and finish diameter.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

Metal Bond Superabrasive Insert Mandrels+

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with either a hardened or carbide shoe mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

Single Insert Mandrel

K16-__AB__JS3X

Double Insert Mandrel

K16-__AB-__KX1X

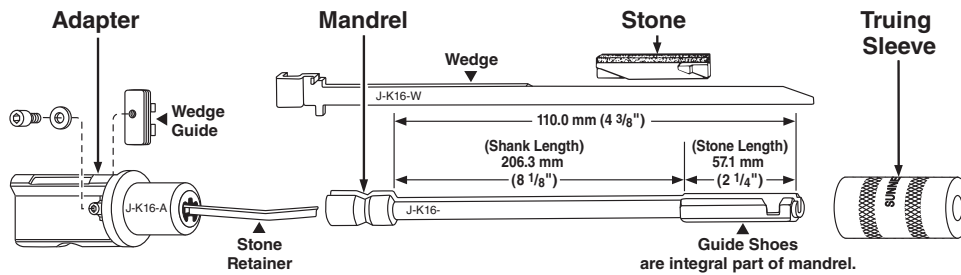
Specify grit size and hardness of insert.

Example: K16-495AB-NM89-KX1X.

+ Special Order - Contact Customer Service

J-K16 Honing Units

Extra-Long
Shank



J-K16 Mandrels are similar to the K16 Mandrels except the shanks are 152.4 mm (6") longer and should be used only when counterbores will not allow holes to be honed properly with standard K16 Mandrels.

In some cases, stones other than the **RECOMMENDED STONES** may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Available Stones

		Grit Size												
		70	80	100	150	220	280	320	400	500	600	900	1200	
Hard-----Soft	Aluminum Oxide Stones (A) - 12 per box													
				K16-A43 K16-A45 K16-A47	K16-A53 K16-A55 K16-A56 K16-A57 K16-A5701A K16-A49 K16-A413	K16-A61 K16-A63 K16-A65 K16-A67 K16-A77 K16-A79 K16-A69	K16-A75							
Hard-----Soft	Silicon Carbide Stones (J,C) - 12 per box													
				K16-J45	K16-J55	K16-J63 K16-J65		K16-J83 K16-J85	K16-J93 K16-J95	K16-C05†				
				K16-J47	K16-J57	K16-J67		K16-J87	K16-J97					
				K16-J49		K16-J69		K16-J89	K16-J99					
Hard-----Soft	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box													
			K16-DM35	K16-DMB45 K16-DM45 K16-DM47 K16-DV47	K16-DMB55 K16-DM55 K16-DM57 K16-DV57 K16-NR51 K16-NR53 K16-NMG57		K16-DM85 K16-DM87 K16-DV87 K16-NR83		K16-DM05 K16-DM07 K16-DV07		K16-DM05 K16-DM07	K16-NM05 K16-NM905	K16-DR007 K16-DM005 K16-NM005	
			K16-NM35 K16-NM37 K16-NM39	K16-NM45 K16-NM47 K16-NM49	K16-NM55 K16-NM57 K16-NM59	K16-NM65 K16-NM67 K16-NM69	K16-NM85 K16-NM87	K16-NM95 K16-NM97						

†For best results, use with bronze mandrel.

Recommended Stones for K16 and J-K16 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _a µm	Approx. R _a µin	Stone to use	Approx. R _a µm	Approx. R _a µin
Deburring: rough holes, all materials						
	K16-A413	—	—	K16-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	K16-J57	1,38	55	K16-DM85	1,25	50
Brass, Soft	K16-J63	0,83	33	K16-J63	0,83	33
Bronze	K16-J57	1,38	55	K16-J57	1,38	55
Carbide	K16-DM55	0,50	20	K16-DM55	0,50	20
Cast Iron	K16-J57	0,50	20	K16-DM55	2,00	80
Ceramic	K16-DM55	1,00	40	K16-DM55	1,00	40
Glass	K16-DM55	1,75	70	K16-DM55	1,75	70
Steel, Soft	K16-A57	0,75	30	K16-NM55	1,25	50
Steel, Hardened**	K16-A55	0,30	12	K16-NM55	1,00	40
Steel, Hardened***	K16-A63	0,30	12	—	—	—
Steel, Very Hard***	K16-NM55	1,00	40	—	—	—
Fine finishing: previously honed holes						
Aluminum	K16-J95	0,30	12	K16-DM05	0,83	33
Brass, Soft	K16-J83	0,40	16	K16-J83	0,40	16
Bronze	K16-J95	0,30	12	K16-J95	0,30	12
Carbide	K16-DM05	0,08	3	K16-DM05	0,08	3
Cast Iron	K16-J95	0,13	5	K16-DM05	0,50	20
Ceramic	K16-DM05	0,38	15	K16-DM05	0,38	15
Glass	K16-DM05	0,38	15	K16-DM05	0,38	15
Steel, Soft	K16-J95	0,10	4	K16-NM05	0,40	16
Steel, Hardened	K16-J83	0,13	5	K16-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

12,45mm - 16,10mm (.490"-.634")

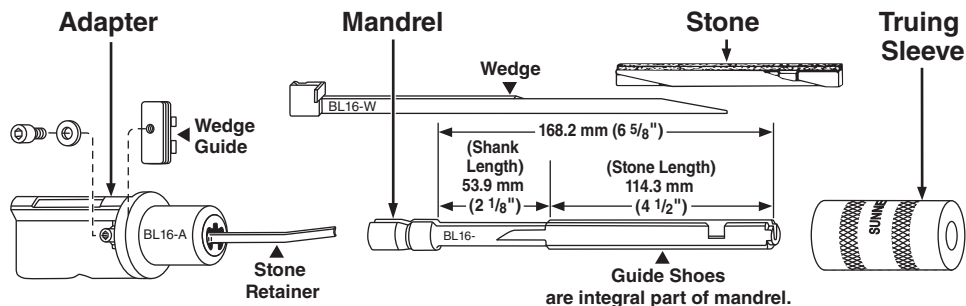
For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low	mm	in	High
ASC-0500	12,7	1/2	12,45	.490	12,93	.509
ASC-0516	13	33/64	12,83	.505	13,31	.524
ASC-0531	13,50	17/32	13,23	.521	13,72	.540
ASC-0547	14	35/64	13,72	.540	14,20	.559
ASC-0562	14,29	9/16	14,02	.552	14,50	.571
ASC-0578	14,68	37/64	14,43	.568	14,91	.587
ASC-0594	15	19/32	14,81	.583	15,29	.602
ASC-0609	15,48	39/64	15,22	.599	15,70	.618
ASC-0625	15,88	5/8	15,62	.615	16,10	.634

BL16

Honing Units

Diameter Range:
12,57 mm – 15,72 mm
.495" – .619"



Order 1-5 For Complete BL16 or L16 Honing Units

Diameter Range 12,57 mm - 15,72 mm .495" - .619"		1 BL16 Mandrel Includes wedge		1 L16 Mandrel Includes wedge		2 Truing Sleeve		3 Adapter For L16 mandrels order L16-A adapter		4 Alignment Bushing		5 Honing Stone	
mm	inches	With Standard Shank Choose One Suffix		With Extra-Long Shank Choose One Suffix				With stone retainer and wedge guide		For machines with fully adjustable spindle nose			
12,57-13,36	.495-.526	BL16-495A	S H B	L16-495A	S H B	S-495		BL16-A		C-495		See All Stone Tables At Right	
13,36-14,15	.526-.557	BL16-526A	S H B	L16-526A	S H B	S-526		BL16-A		C-526			
14,15-14,94	.557-.588	BL16-557A	S H B	L16-557A	S H B	S-557		BL16-A		C-557			
14,94-15,72	.588-.619	BL16-588A	S H B	L16-588A	S H B	S-588		BL16-A		C-588			

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for producing very fine finishes and honing exotic metals.*

BL16 Mandrel Replacement Parts

BL16-W Wedge
Replace when wear *begins* to show
LN-3686A Stone Retainer
LN-3217A Wedge Guide

L16 Mandrel Replacement Parts

L16-W Wedge
Replace when wear *begins* to show
LN-3690A Stone Retainer
LN-3217A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some applications...plus faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. The following mandrels available from stock: **BL16-495AS-D**, **BL16-526AS-D**, **BL16-557AS-D**, or **BL16-588AS-D**. Select appropriate soft steel mandrel and add -D+.

Example: BL16-495AS-D+.

Carbide Shoe Mandrels+

Two types are available for high-production applications...in either Round Carbide Rod Inserted or Full Carbide Shoe Mandrels. In the correct application they last longer than standard hardened mandrels. When ordering full-carbide type specify starting and finish diameter.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Sunnen Honing Units can be used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

Metal Bond Superabrasive Insert Mandrels+

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with either a hardened or carbide shoe mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

Single Insert Mandrel

BL16-__AB__JS3X

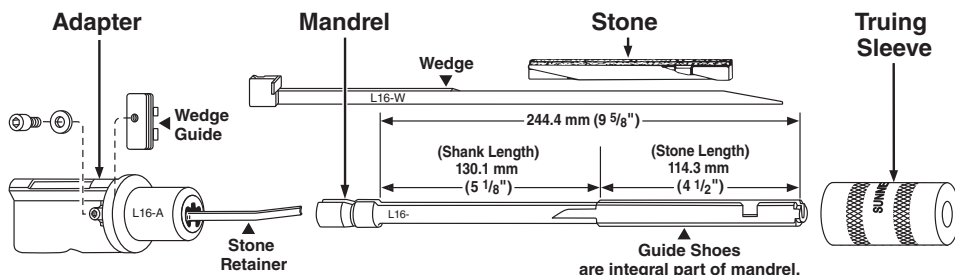
Double Insert Mandrel

BL16-__AB__KX1X

Specify grit size and hardness of insert.

Example: BL16-245AB-NM89-KX1X

* Special Order - Contact Customer Service



L16 Mandrels are like the BL16 Mandrels except the shanks are 76.2 mm (3") longer.
Use only when the BL16 is too short.

L16 Honing Units

Extra-Long
Shank

In some cases, stones other than the **RECOMMENDED STONES** may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Available Stones

		Grit Size												
		70	80	100	150	220	280	320	400	500	600	900	1200	
Hard-----Soft	Aluminum Oxide Stones (A) - 6 per box													
				L16-A43 L16-A45	L16-A55	L16-A61 L16-A63 L16-A65	L16-A75							
				L16-A47	L16-A57	L16-A67	L16-A77							
				L16-A49 L16-A413	L16-A59	L16-A69	L16-A79							
Hard-----Soft	Silicon Carbide Stones (J,C) - 6 per box													
				L16-J45	L16-J55	L16-J63 L16-J65		L16-J83 L16-J85	L16-J93 L16-J95	L16-C05†				
				L16-J47	L16-J57	L16-J67		L16-J87	L16-J97					
				L16-J49		L16-J69		L16-J89	L16-J99					
Hard-----Soft	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box													
		L16-DM35	L16-DMB45	L16-DM55				L16-DM85		L16-DM05		L16-DR007 L16-DM005		
				L16-DV57 L16-NR51 L16-NR53 L16-NMG57				L16-DM87 L16-DV87		L16-DV07				
		L16-NM35 L16-NM39	L16-NM45 L16-NM47	L16-NM55 L16-NM57 L16-NM59	L16-NM65 L16-NM67		L16-NM85 L16-NM87	L16-NM95	L16-NM05	L16-NM905	L16-NM005			

†For best results, use with bronze mandrel.

Recommended Stones for BL16 and L16 Mandrels

Material	Low-Volume		High-Volume	
	Stone to use	Approx. R _a Surface Finish µm µin	Stone to use	Approx. R _a Surface Finish µm µin
Deburring: rough holes, all materials				
	L16-A413	—	L16-A413	—
Fast removal: deburred, bored, ground, reamed holes				
Aluminum	L16-J57	1,38 55	L16-DM85	1,25 50
Brass, Soft	L16-J63	0,83 33	L16-J63	0,83 33
Bronze	L16-J57	1,38 55	L16-J57	1,38 55
Carbide	L16-DM55	0,50 20	L16-DM55	0,50 20
Cast Iron	L16-J57	0,50 20	L16-DM55	2,00 80
Ceramic	L16-DM55	1,00 40	L16-DM55	1,00 40
Glass	L16-DM55	1,75 70	L16-DM55	1,75 70
Steel, Soft	L16-A57	0,75 30	L16-NM55	1,25 50
Steel, Hardened*	L16-A55	0,30 12	L16-NM55	1,00 40
Steel, Hardened**	L16-A63	0,30 12	—	—
Steel, Very Hard***	L16-NM55	1,00 40	—	—
Fine finishing: previously honed holes				
Aluminum	L16-J95	0,30 12	L16-DM05	0,83 33
Brass, Soft	L16-J83	0,40 16	L16-J83	0,40 16
Bronze	L16-J95	0,30 12	L16-J95	0,30 12
Carbide	L16-DM05	0,08 3	L16-DM05	0,08 3
Cast Iron	L16-J95	0,13 5	L16-DM05	0,50 20
Ceramic	L16-DM05	0,38 15	L16-DM05	0,38 15
Glass	L16-DM05	0,38 15	L16-DM05	0,38 15
Steel, Soft	L16-J95	0,10 4	L16-NM05	0,40 16
Steel, Hardened	L16-J83	0,13 5	L16-NM05	0,18 7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

12,45mm - 16,10mm (.490"-.634")

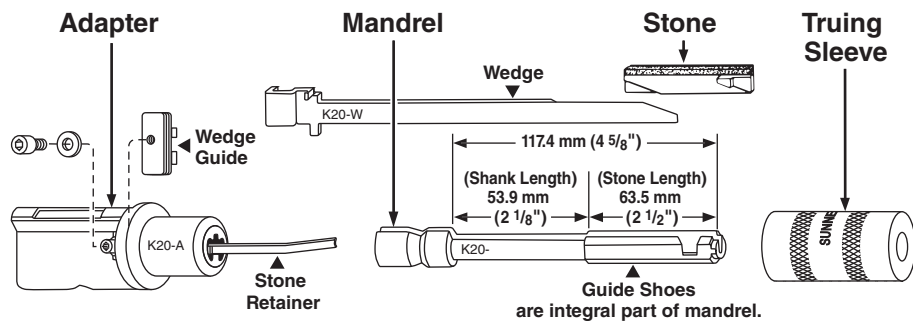
For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low		High	
ASC-0500	12,7	1/2	12,45	.490	12,93	.509
ASC-0516	13	33/64	12,83	.505	13,31	.524
ASC-0531	13,50	17/32	13,23	.521	13,72	.540
ASC-0547	14	35/64	13,72	.540	14,20	.559
ASC-0562	14,29	9/16	14,02	.552	14,50	.571
ASC-0578	14,68	37/64	14,43	.568	14,91	.587
ASC-0594	15	19/32	14,81	.583	15,29	.602
ASC-0609	15,48	39/64	15,22	.599	15,70	.618
ASC-0625	15,88	5/8	15,62	.615	16,10	.634

K20

Honing Units

Diameter Range:
15,72 mm – 18,90 mm
.619" – .744"



Order 1-5 For Complete K20 or J-K20 Honing Units

Diameter Range 15,72 mm - 18,90 mm .619" - .744"		1 K20 Mandrel Includes wedge			1 J-K20 Mandrel Includes wedge			2 Truing Sleeve	3 Adapter For J-K20 mandrels order J-K20-A adapter	4 Alignment Bushing	5 Honing Stone
		With Standard Shank			With Extra-Long Shank				With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
		Choose One Suffix			Choose One Suffix						
mm	inches										
15,72-16,51	.619-.650	K20-619A	S	H	B	J-K20-619A	S	H	S-619	K20-A	C-619
15,90-16,69	.625-.657	K20-16MMA	NA	H	NA	N/A	NA	NA	S-16MM	K20-A	C-16MM
16,51-17,30	.650-.681	K20-650A	S	H	B	J-K20-650A	S	H	S-650	K20-A	C-650
16,90-17,69	.665-.697	K20-17MMA	NA	H	NA	N/A	NA	NA	S-17MM	K20-A	C-17MM
17,30-18,11	.681-.713	K20-681A	S	H	B	J-K20-681A	S	H	S-681	K20-A	C-681
17,90-18,71	.704-.737	K20-18MMA	NA	H	NA	N/A	NA	NA	S-18MM	K20-A	C-18MM
18,11-18,90	.713-.744	K20-713A	S	H	B	J-K20-713A	S	H	S-713	K20-A	C-713

See All
Stone
Tables
At Right

Mandrel Options

S = Steel Mandrel w/ soft shoes, for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for very fine finishes and honing exotic metals.
NOTE: J-K20 Mandrels not available in bronze.

Retractable Mandrels

For high production, automation and high stress loads using superabrasive stones. See page 2.86.
NOTE: Available in KR20+ only.

K20 Mandrel Replacement Parts

K20-W Wedge
Replace when wear *begins* to show
LN-3688A Stone Retainer
LN-3218A Wedge Guide

J-K20 Mandrel Replacement Parts

J-K20-W Wedge
Replace when wear *begins* to show
LN-3704A Stone Retainer
LN-3218A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some applications...plus faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. The following mandrels available from stock: **K20-619ASD**, **K20-681ASD**, **K20-713ASD**. Select appropriate soft steel mandrel and add -D.+

Example: K20-650AS-D.+

Carbide Shoe Mandrels+

Two types are available for high-production applications...in either Round Carbide Rod Inserted or Full Carbide Shoe Mandrels. In the correct application they last longer than standard hardened mandrels. When ordering full-carbide type specify starting and finish diameter.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

Metal Bond Superabrasive Insert Mandrels+

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with either a hardened or carbide shoe mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

Single Insert Mandrel

K20-__AB__JS3X

Double Insert Mandrel

K20-__AB__KX1X

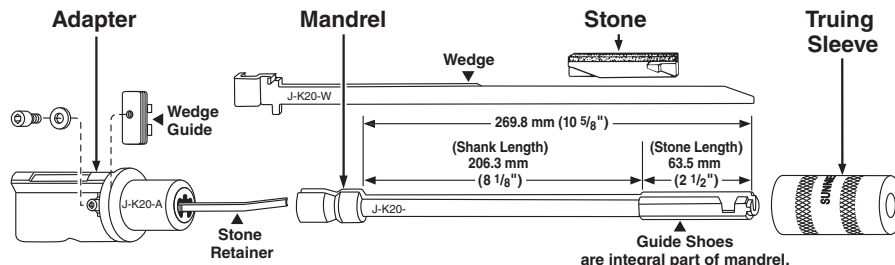
Specify grit size and hardness of insert.

Example: K20-245AB-NM89-KX1X

+ Special Order - Contact Customer Service

J-K20 Honing Units

Extra-Long Shank



J-K20 Mandrels are similar to the K20 Mandrels except the shanks are 152.4 mm (6") longer and should be used only when counterbores will not allow holes to be honed properly with standard K20 Mandrels.

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Available Stones

		Handmade Stones											
		70	80	100	150	220	280	320	400	500	600	900	1200
		Aluminum Oxide Stones (A) - 12 per box											
Hard-----Soft		K20-A27		K20-A43 K20-A45 K20-A47	K20-A53 K20-A55 K20-A57 K20-A5701A	K20-A61 K20-A63 K20-A65 K20-A67	K20-A75 K20-A77						
			K20-A49 K20-A411 K20-A413	K20-A58 K20-A59	K20-A68 K20-A69	K20-A79							
		Silicon Carbide Stones (J,C) - 12 per box											
Hard-----Soft		K20-J25 K20-J27		K20-J45 K20-J47	K20-J55 K20-J57 K20-J5701A K20-J58 K20-J59	K20-J63 K20-J65 K20-J67 K20-J6701A K20-J69		K20-J83 K20-J85 K20-J87 K20-J8701A K20-J89	K20-J93 K20-J95 K20-J9501A K20-J97 K20-J99	K20-C05†			
		Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box											
Hard-----Soft	K20-NM15		K20-DM35	K20-DMB45 K20-DM45	K20-DMB55 K20-DM55 K20-DM57			K20-DM85 K20-DM87	K20-DM95	K20-DM05 K20-DM07	K20-DM905		K20-DR007 K20-DM005
			K20-DV47	K20-DV57 K20-NR51 K20-NR53 K20-NMB55 K20-NMG57		K20-DV87 K20-NR83		K20-DV07					
			K20-NM35 K20-NM37 K20-NM39	K20-NM45 K20-NM47 K20-NM49	K20-NM55 K20-NM57 K20-NM59	K20-NM65 K20-NM67 K20-NM69	K20-NMG85 K20-NM85 K20-NM87 K20-NM89	K20-NM95 K20-NM97	K20-NM05	K20-NM905	K20-NM005		

‡For best results, use with bronze mandrel.

Recommended Stones for K20 and J-K20 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _a µm	Approx. R _a µin	Stone to use	Approx. R _a µm	Approx. R _a µin
Deburring: rough holes, all materials						
	K20-A413	—	—	K20-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	K20-J57	1,38	55	K20-DM85	1,25	50
Brass, Soft	K20-J63	0,83	33	K20-J63	0,83	33
Bronze	K20-J57	1,38	55	K20-J57	1,38	55
Carbide	K20-DM55	0,50	20	K20-DM55	0,50	20
Cast Iron	K20-J57	0,50	20	K20-DM55	2,00	80
Ceramic	K20-DM55	1,00	40	K20-DM55	1,00	40
Glass	K20-DM55	1,75	70	K20-DM55	1,75	70
Steel, Soft	K20-A57	0,75	30	K20-NM55	1,25	50
Steel, Hardened**	K20-A55	0,30	12	K20-NM55	1,00	40
Steel, Hardened***	K20-A63	0,30	12	—	—	—
Steel, Very Hard***	K20-NM55	1,00	40	—	—	—
Fine finishing: previously honed holes						
Aluminum	K20-J95	0,30	12	K20-DM05	0,83	33
Brass, Soft	K20-J83	0,40	16	K20-J83	0,40	16
Bronze	K20-J95	0,30	12	K20-J95	0,30	12
Carbide	K20-DM05	0,08	3	K20-DM05	0,08	3
Cast Iron	K20-J95	0,13	5	K20-DM05	0,50	20
Ceramic	K20-DM05	0,38	15	K20-DM05	0,38	15
Glass	K20-DM05	0,38	15	K20-DM05	0,38	15
Steel, Soft	K20-J95	0,10	4	K20-NM05	0,40	16
Steel, Hardened	K20-J83	0,13	5	K20-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

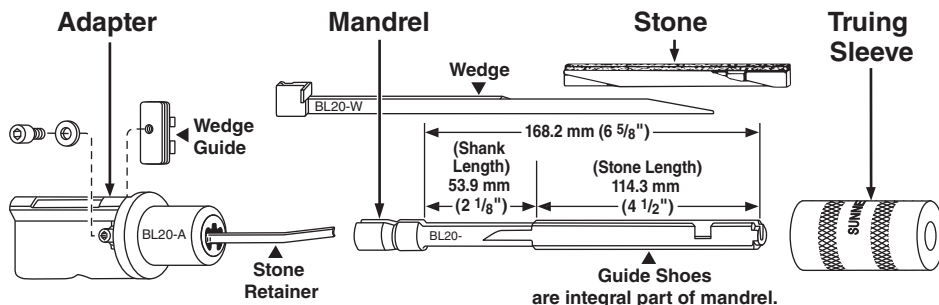
15,62mm - 19,28mm (.615"-.759")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	in	High mm	in
ASC-0625	15,88	5/8	15,62	.615	16,10	.634
ASC-0630	16		15,75	.620	16,23	.639
ASC-0641	16,27	41/64	16,03	.631	16,51	.650
ASC-0656	16,67	21/32	16,41	.646	16,89	.665
ASC-0672	17	43/64	16,79	.661	17,27	.680
ASC-0688	17,46	11/16	17,22	.678	17,70	.697
ASC-0703	18	45/64	17,70	.697	18,19	.716
ASC-0719	18,26	23/32	18,01	.709	18,49	.728
ASC-0734	18,65	47/64	18,39	.724	18,87	.743
ASC-0750	19	3/4	18,80	.740	19,28	.759

BL20 Honing Units

Diameter Range:
15,72 mm – 18,90 mm
.619" – .744"



Order 1-5 For Complete BL20 or L20 Honing Units

Diameter Range 15,72 mm - 18,90 mm .619" - .744"		1 BL20 Mandrel Includes wedge				1 L20 Mandrel Includes wedge				2 Truing Sleeve		3 Adapter For L20 mandrels order L20-A adapter		4 Alignment Bushing		5 Honing Stone	
mm	inches	With Standard Shank Choose One Suffix				With Extra-Long Shank Choose One Suffix					With stone retainer and wedge guide	For machines with fully adjustable spindle nose		See All Stone Tables At Right			
15,72-16,51	.619-.650	BL20-619A	S	H	B	L20-619A	S	H	B	S-619	BL20-A	C-619					
16,51-17,30	.650-.681	BL20-650A	S	H	B	L20-650A	S	H	B	S-650	BL20-A	C-650					
17,30-18,11	.681-.713	BL20-681A	S	H	B	L20-681A	S	H	B	S-681	BL20-A	C-681					
18,11-18,90	.713-.744	BL20-713A	S	H	B	L20-713A	S	H	B	S-713	BL20-A	C-713					

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel. For very fine finishes and honing exotic metals.*

BL20 Mandrel Replacement Parts

BL20-W Wedge
 Replace when wear **begins** to show
LN-3688A Stone Retainer
LN-3218A Wedge Guide

L20 Mandrel Replacement Parts

L20-W Wedge
 Replace when wear **begins** to show
LN-3692A Stone Retainer
LN-3218A Wedge Guide

Diamond Plated Super Mandrels+

Designed to provide a long-wearing guide shoe to increase mandrel life in some applications...plus faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond. Select appropriate soft steel mandrel and add -D.*

Example: BL20-619AS-D.*

Carbide Shoe Mandrels+

Two types are available for high-production applications... in either Round Carbide Rod Inserted or Full Carbide Shoe Mandrels. In the correct application they last longer than standard hardened mandrels. When ordering full-carbide type specify starting and finish diameter.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Sunnen Honing Units can be used to size two or more "in-line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

Metal Bond Superabrasive Insert Mandrels+

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with either a hardened or carbide shoe mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

Single Insert Mandrel

BL20-__AB__JS3X

Double Insert Mandrel

BL20-__AB__KX1X

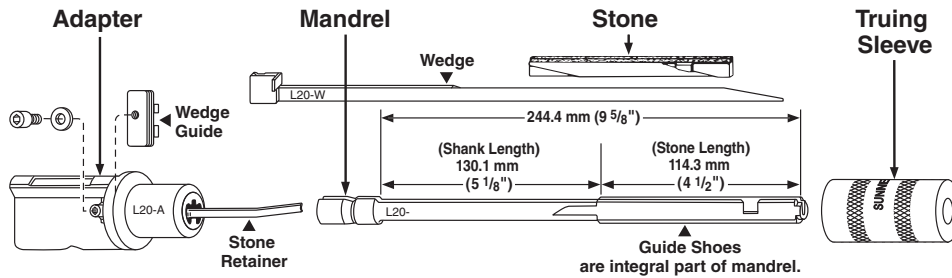
Specify grit size and hardness of insert.

Example: BL20-245AB-NM89-KX1X

* Special Order - Contact Customer Service

L20 Honing Units

Extra-Long Shank



L20 Mandrels are like the BL20 Mandrels except the shanks are 76.2 mm (3") longer.
Use only when the BL20 is too short.

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

†For best results, use with bronze mandrel.

Available Stones

	Grit Size											
	70	80	100	150	220	280	320	400	500	600	900	1200
Soft	Aluminum Oxide Stones (A) - 6 per box											
				L20-A43 L20-A45	L20-A55	L20-A61 L20-A63 L20-A65	L20-A75					
				L20-A47	L20-A57 L20-A5701A L20-A59	L20-A67 L20-A69	L20-A77 L20-A79					
				L20-A49 L20-A411 L20-A413								
Hard	Silicon Carbide Stones (J,C) - 6 per box											
				L20-J45	L20-J55	L20-J63 L20-J65		L20-J83 L20-J85	L20-J93 L20-J95	L20-C05†		
				L20-J47	L20-J57	L20-J67		L20-J87	L20-J97			
				L20-J49	L20-J59	L20-J69		L20-J89	L20-J99			
Hard	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vittrified (V) Bond - 1 per box											
			L20-DM35 L20-DMB45		L20-DM55			L20-DM85 L20-DM87		L20-DM05		L20-DR007 L20-DM005
					L20-DV57 L20-NR51 L20-NR53 L20-NMG57			L20-DV87		L20-DV07		
		L20-NM35 L20-NM37 L20-NM39	L20-NM45 L20-NM47	L20-NM55 L20-NM57 L20-NM59	L20-NM65 L20-NM67			L20-NM85 L20-NM87	L20-NM95	L20-NM05 L20-NM905	L20-NM005	

Recommended Stones for BL20 and L20 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _a Surface Finish µm µin		Stone to use	Approx. R _a Surface Finish µm µin	
Deburring: rough holes, all materials						
	L20-A413	—	—	L20-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	L20-J57	1,38	55	L20-DM85	1,25	50
Brass, Soft	L20-J63	0,83	33	L20-J63	0,83	33
Bronze	L20-J57	1,38	55	L20-J57	1,38	55
Carbide	L20-DM55	0,50	20	L20-DM55	0,50	20
Cast Iron	L20-J57	0,50	20	L20-DM55	2,00	80
Ceramic	L20-DM55	1,00	40	L20-DM55	1,00	40
Glass	L20-DM55	1,75	70	L20-DM55	1,75	70
Steel, Soft	L20-A57	0,75	30	L20-NM55	1,25	50
Steel, Hardened*	L20-A55	0,30	12	L20-NM55	1,00	40
Steel, Hardened***	L20-A63	0,30	12	—	—	—
Steel, Very Hard***	L20-NM55	1,00	40	—	—	—
Fine finishing: previously honed holes						
Aluminum	L20-J95	0,30	12	L20-DM05	0,83	33
Brass, Soft	L20-J83	0,40	16	L20-J83	0,40	16
Bronze	L20-J95	0,30	12	L20-J95	0,30	12
Carbide	L20-DM05	0,08	3	L20-DM05	0,08	3
Cast Iron	L20-J95	0,13	5	L20-DM05	0,50	20
Ceramic	L20-DM05	0,38	15	L20-DM05	0,38	15
Glass	L20-DM05	0,38	15	L20-DM05	0,38	15
Steel, Soft	L20-J95	0,10	4	L20-NM05	0,40	16
Steel, Hardened	L20-J83	0,13	5	L20-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

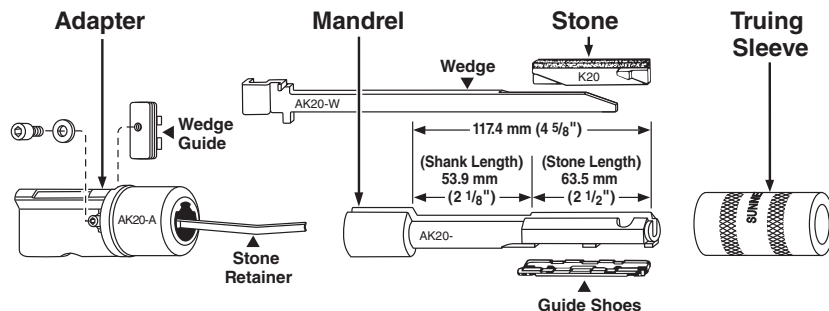
15,62mm - 19,28mm (.615"-.759")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	Low in	High mm	High in
ASC-0625	15,88	5/8	15,62	.615	16,10	.634
ASC-0630	16		15,75	.620	16,23	.639
ASC-0641	16,27	41/64	16,03	.631	16,51	.650
ASC-0656	16,67	21/32	16,41	.646	16,89	.665
ASC-0672	17	43/64	16,79	.661	17,27	.680
ASC-0688	17,46	11/16	17,22	.678	17,70	.697
ASC-0703	18	45/64	17,70	.697	18,19	.716
ASC-0719	18,26	23/32	18,01	.709	18,49	.728
ASC-0734	18,65	47/64	18,38	.724	18,87	.743
ASC-0750	19	3/4	18,80	.740	19,28	.759

AK20 Honing Units

Diameter Range:
18,90 mm – 31,75 mm
.744" – 1.250"



Order 1-5 For Complete AK20 or J-AK20 Honing Units

Diameter Range 18,90 mm – 26,19 mm .744" – 1.251"		1 AK/J-AK20 Mandrel Includes Replacement Shim Set LN-1164		2 Truing Sleeve		3 Adapter For JAK20 Mandrel- Order JAK20 Adapter		4 Alignment Bushing†		5 Honing Stone		Replacement Parts	
mm	inches	Choose 1 Prefix				With stone retainer and wedge guide		For machines with fully adjustable spindle nose.				Guide Shoes 1 required, packed 2 per box Choose 1 Suffix	Guide Shoe Screws Flat Head Brass
18,90-19,68	.744-.775	AK	JAK	20-744UA	S-744	AK20-A		C-750				UA C B CH	LN-1547A 4 - 40 x 7/32"
19,68-20,47	.775-.806	AK	JAK	20-775UA	S-775	AK20-A		C-750				UA C B CH	
19,90-20,69	.783-.815	AK	NA	20-20MMUA	S-20MM	AK20-A		C-20MM				UA - - CH	
20,47-21,29	.806-.838	AK	JAK	20-806UB	S-806	AK20-A		C-812				UB C B CH	
21,29-22,07	.838-.869	AK	JAK	20-838UB	S-838	AK20-A		C-812				UB C B CH	
21,90-22,69	.862-.893	AK	NA	20-22MMUB	S-22MM	AK20-A		C-22MM				UB - - CH	
22,07-22,86	.869-.900	AK	JAK	20-869UB	S-869	AK20-A		C-875				UB C B CH	LN-1548A 4 - 40 x 1/4"
22,86-23,65	.900-.931	AK	JAK	20-900UC	S-900	AK20-A		C-875				UC C B CH	
23,65-24,43	.931-.962	AK	JAK	20-931UC	S-931	AK20-A		C-937				UC C B CH	
23,90-24,69	.940-.972	AK	NA	20-24MMUC	S-24MM	AK20-A		C-24MM				UC - - CH	24MM
24,43-25,25	.962-.994	AK	JAK	20-962UC	S-962	AK20-A		C-937				UC C B CH	
25,25-26,19	.994-1.031	AK	JAK	20-994UC	S-994	AK20-A		C-1000				UC C B CH	
24,90-25,72	.980-1.012	AK	NA	20-25MMUC	S-25MM	AK20-A		C-25MM				UC - - CH	25MM
25,15-26,97	.990-1.062	AK	JAK*	20-1000UD	S-994	AK20-A		C-1000				UD - B BH	
26,72-28,57	1.052-1.125	AK	JAK*	20-1062UD	S-1062	AK20-A		C-1062				UD - B BH	LN-1247A 6 - 32 x 5/16"
28,32-30,15	1.115-1.187	AK	JAK*	20-1125UE	S-1125	AK20-A		C-1125				UE - B BH	
29,90-31,75	1.177-1.250	AK	JAK*	20-1187UE	S-1187	AK20-A		C-1187				UE - B BH	

See All Stone Tables At Right

Mandrel Options

AK = Standard shank. JAK = Extra long shank.

† Alignment Bushings

Select the bushing whose bore diameter is just *under* finish size. When setting up the job for the first time, the undersize alignment bushing can be honed out to finish size with the same tooling used for honing the workpiece.

Guide Shoe Options

C= SUNALOY® General purpose shoe for most honing applications. Furnished with Mandrel.

B= Bronze for finer finishes and soft or difficult materials. Order separately.

CH/BH= Hard steel for production honing or hard, rough parts or carbide, ceramic, etc. Order separately.

AK20 Mandrel Replacement Parts

K20-W	Wedge
LN-3688A	Stone Retainer
LN-3218A	Wedge Guide

J-AK20 Mandrel Replacement Parts

J-K20-W	Wedge
LN-3704A	Stone Retainer
LN-3218A	Wedge Guide
LN-1164A	Shim Set

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

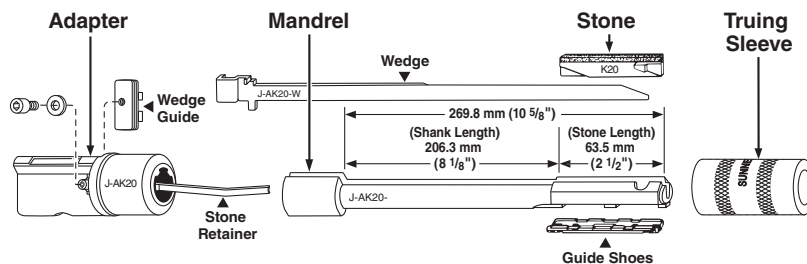
Sunnen Honing Units can be used to size two or more "in-line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

Additional Guide Shoes

Carbide Inserted Guide Shoes	Diamond Plated Guide Shoes (120 Grit)	Metal Bond Superabrasive Inserted Guide Shoes
	Specify part finish diameter when ordering	Specify abrasive type, grit size, and hardness.
UA-B-TX	UA-B- -DX	UA-B- -JS2X
UB-B-TX	UB-B- -DX	UB-B- -JS2X
UC-B-TX	UC-B- -DX	UC-B- -JS2X
UD-B-TX	UD-B- -DX	UD-B- -JS2X
UE-B-TX	UE-B- -DX	UE-B- -JS2X

Ex: UA-B-750-DX Ex: UA-B-NM89-JS2X (1 required—packed 1 per box).

+ Special Order - Contact Customer Service



J-K20 Mandrels are similar to the K20 Mandrels except the shanks are 152.4 mm (6") longer and should be used only when counterbores will not allow holes to be honed properly with standard K20 Mandrels.

J-AK20 Honing Units

Extra-Long Shank

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

†For best results, use with bronze guide shoes.

Available Stones

		Grit Size											
		70	80	100	150	220	280	320	400	500	600	900	1200
Hard-----Soft	Aluminum Oxide Stones (A) - 12 per box												
		K20-A27		K20-A43	K20-A53	K20-A61							
				K20-A45	K20-A55	K20-A63							
			K20-A47	K20-A57	K20-A67	K20-A77							
				K20-A5701A									
			K20-A49	K20-A58	K20-A68	K20-A79							
			K20-A411	K20-A59	K20-A69								
			K20-A413										
Hard-----Soft	Silicon Carbide Stones (J,C) - 12 per box												
		K20-J25 K20-J27		K20-J45	K20-J55	K20-J63		K20-J83	K20-J93	K20-C05†			
				K20-J47	K20-J57	K20-J65		K20-J85	K20-J95				
				K20-J5701A	K20-J6701A		K20-J87	K20-J9501A	K20-J97				
			K20-J49	K20-J58	K20-J69		K20-J8701A						
				K20-J59			K20-J89	K20-J99					
Hard-----Soft	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box												
			K20-DM35	K20-DMB45	K20-DMB55			K20-DM85 K20-DM87	K20-DM95	K20-DM05 K20-DM07	K20-DM905		K20-DR007
				K20-DM45	K20-DM55 K20-DM57								K20-DM05
			K20-DV47	K20-DV57	K20-DV87								
				K20-NR51	K20-NR83								
				K20-NR53									
				K20-NMB55									
				K20-NMG57			K20-NMG85						
	K20-NM15	K20-NM35	K20-NM45	K20-NM55	K20-NM65		K20-NM85	K20-NM95	K20-NM05	K20-NM905	K20-NM005		
		K20-NM37	K20-NM47	K20-NM57	K20-NM67		K20-NM87	K20-NM97					
		K20-NM39	K20-NM49	K20-NM59	K20-NM69		K20-NM89						

Recommended Stones for K20 and J-AK20 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin
Deburring: rough holes, all materials						
	K20-A413	—	—	K20-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	K20-J57	1,38	55	K20-DM85	1,25	50
Brass, Soft	K20-J63	0,83	33	K20-J63	0,83	33
Bronze	K20-J57	1,38	55	K20-J57	1,38	55
Carbide	K20-DM55	0,50	20	K20-DM55	0,50	20
Cast Iron	K20-J57	0,50	20	K20-DM55	2,00	80
Ceramic	K20-DM55	1,00	40	K20-DM55	1,00	40
Glass	K20-DM55	1,75	70	K20-DM55	1,75	70
Steel, Soft	K20-A57	0,75	30	K20-NM55	1,25	50
Steel, Hardened*	K20-A55	0,30	12	K20-NM55	1,00	40
Steel, Hardened**	K20-A63	0,30	12	—	—	—
Steel, Very Hard***	K20-NM55	1,00	40	—	—	—
Fine finishing: previously honed holes						
Aluminum	K20-J95	0,30	12	K20-DM05	0,83	33
Brass, Soft	K20-J83	0,40	16	K20-J83	0,40	16
Bronze	K20-J95	0,30	12	K20-J95	0,30	12
Carbide	K20-DM05	0,08	3	K20-DM05	0,08	3
Cast Iron	K20-J95	0,13	5	K20-DM05	0,50	20
Ceramic	K20-DM05	0,38	15	K20-DM05	0,38	15
Glass	K20-DM05	0,38	15	K20-DM05	0,38	15
Steel, Soft	K20-J95	0,10	4	K20-NM05	0,40	16
Steel, Hardened	K20-J83	0,13	5	K20-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

18,90mm -31,75mm (.744"-1.250")

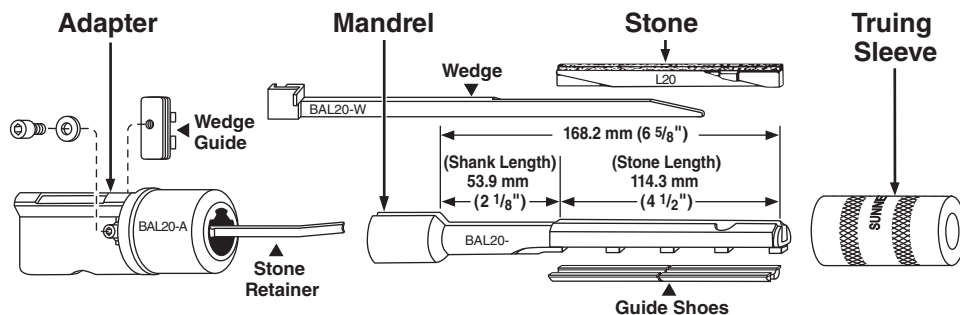
For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter	Diameter Range			
		Low		High	
mm	in	mm	in	mm	in
ASC-0750	19 3/4	18,80	.740	19,28	.759
ASC-0766	19,45 49/64	19,20	.756	19,69	.775
ASC-0781	20 25/32	19,69	.775	20,17	.794
ASC-0797	20,24 51/64	19,99	.787	20,47	.806
ASC-0812	20,64 13/16	20,37	.802	20,85	.821
ASC-0828	21 53/64	20,78	.818	21,26	.837
ASC-0844	21,43 27/32	21,18	.834	21,67	.853
ASC-0859	22 55/64	21,67	.853	22,15	.872
ASC-0875	22,22 7/8	21,97	.865	22,45	.884
ASC-0891	22,62 57/64	22,38	.881	22,86	.900
ASC-0906	23 29/32	22,76	.896	23,24	.915
ASC-0922	23,42 59/64	23,17	.912	23,65	.931
ASC-0938	24 15/16	23,67	.932	24,16	.951
ASC-0953	24,21 61/64	23,95	.943	24,44	.962
ASC-0969	24,61 31/32	24,36	.959	24,84	.978
ASC-0984	25 63/64	24,69	.972	25,17	.991
ASC-1000	25,40 1	25,15	.990	25,63	1.010
ASC-1016	26 1-1/64	25,68	1.011	26,16	1.030
ASC-51†	—	26,00	1.000	32,00	1.250

†Requires the use of ASC-50 Setting Fixture. Specify ASC-50M for metric version.

BAL20 Honing Units

Diameter Range:
18,90 mm – 26,19 mm
.744" – 1.031"



Order 1-5 For Complete BAL20 or AL20 Honing Units

Diameter Range 18,90 mm - 26,19 mm .744" - 1.031"		<div>1</div> AL/BAL20 Mandrel Includes wedge and SUNALOY® guide shoes		<div>2</div> Truing Sleeve		<div>3</div> Adapter For AL20 mandrels Order AL20-A adapter		<div>4</div> Alignment Bushing† For machines with fully adjustable spindle nose.		<div>5</div> Honing Stone		Replacement Parts					
mm	inches	Choose 1 Prefix				Includes stone retainer and wedge guide				See All Stone Tables At Right		Guide Shoes 1 required, packed 2 per box Choose 1 Suffix				Guide Shoe Screws Flat Head Brass	
18,90-19,68	.744-.775	BAL	AL	20-744LA	S-744	BAL20-A		C-713				LA	C	B	CH	LN-1547A 4 - 40 x 7/32"	
19,68-20,47	.775-.806	BAL	AL	20-775LA	S-775	BAL20-A		C-750				LA	C	B	CH		
20,47-21,29	.806-.838	BAL	AL	20-806LB	S-806	BAL20-A		C-812				LB	C	B	CH		
21,29-22,07	.838-.869	BAL	AL	20-838LB	S-838	BAL20-A		C-875				LB	C	B	CH		
22,07-22,86	.869-.900	BAL	AL	20-869LB	S-869	BAL20-A		C-875				LB	C	B	CH		
22,86-23,65	.900-.931	BAL	AL	20-900LC	S-900	BAL20-A		C-875				LC	C	B	CH	LN-1548A 4 - 40 x 1/4"	
23,65-24,43	.931-.962	BAL	AL	20-931LC	S-931	BAL20-A		C-937				LC	C	B	CH		
24,43-25,25	.962-.994	BAL	AL	20-962LC	S-962	BAL20-A		C-937				LC	C	B	CH		
25,25-26,19	.994-1.031	BAL	AL	20-994LC	S-994	BAL20-A		C-1000				LC	C	B	CH		

Mandrel Options

BAL = Standard shank. AL = Extra long shank.

Alignment Bushings

Select the bushing whose bore diameter is just *under* finish size. When setting up the job for the first time, the undersize alignment bushing can be honed out to finish size with the same tooling used for honing the workpiece.

Guide Shoe Options

C= SUNALOY® General purpose shoe for most honing applications. Furnished with Mandrel.

B= Bronze for finer finishes and soft or difficult materials. Order separately.

CH= Hard steel for production honing or hard, rough parts or carbide, ceramic, etc. Order separately.

BAL20 Mandrel Replacement Parts

BL20-W Wedge
Replace when wear *begins* to show

LN-3688A Stone Retainer
LN-3218A Wedge Guide

AL20 Mandrel Replacement Parts

L20-W Wedge
Replace when wear *begins* to show

LN-3692A Stone Retainer
LN-3218A Wedge Guide

Extended Shank Mandrels⁺

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels⁺

Sunnen Honing Units can be used to size two or more "in-line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

Additional Guide Shoes

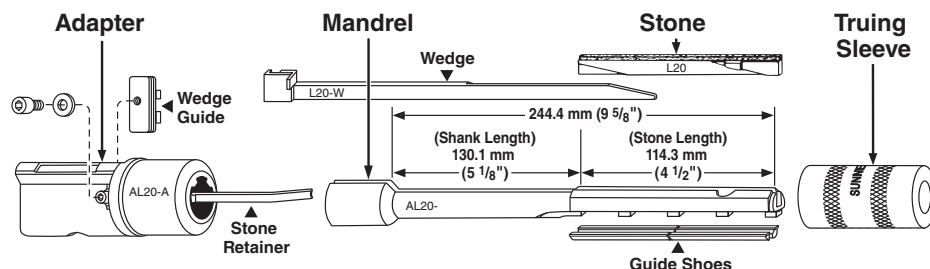
Carbide Inserted Guide Shoes	Diamond Plated Guide Shoes (120 Grit)	Metal Bond Superabrasive Inserted Guide Shoes
	Specify part finish diameter when ordering	Specify abrasive type, grit size, and hardness.
LA-B-TX	LA-B-____-DX	LA-B-____-JS2X
LB-B-TX	LB-B-____-DX	LB-B-____-JS2X
LC-B-TX	LC-B-____-DX	LC-B-____-JS2X

Ex: LA-B-744-DX Ex: LA-B-NM89-JS2X (2 required—packed 1 per box).

⁺ Special Order - Contact Customer Service

AL20 Honing Units

Extra-Long Shank



AL20 Mandrels are like BAL20 Mandrels except the shanks are 76.2 mm (3") longer.
Use only when BAL20 is too short.

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

†For best results, use with bronze mandrel.

Available Stones

Grit Size

70 80 100 150 220 280 320 400 500 600 900 1200

Aluminum Oxide Stones (A) - 6 per box

Hard-----Soft			L20-A43 L20-A45	L20-A55	L20-A61 L20-A63 L20-A65	L20-A75					
			L20-A47	L20-A57 L20-A5701A L20-A59	L20-A67	L20-A77					
			L20-A49 L20-A411 L20-A413		L20-A69	L20-A79					

Silicon Carbide Stones (J,C) - 6 per box

Hard-----Soft			L20-J45	L20-J55	L20-J63 L20-J65	L20-J83 L20-J85	L20-J93 L20-J95	L20-C05†			
			L20-J47	L20-J57	L20-J67	L20-J87	L20-J97				
			L20-J49	L20-J59	L20-J69	L20-J89	L20-J99				

Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box

Hard-----Soft		L20-DM35 L20-DMB45		L20-DM55		L20-DM85 L20-DM87		L20-DM05		L20-DR007 L20-DM005
				L20-DV57 L20-NR51 L20-NR53 L20-NMG57		L20-DV87		L20-DV07		
		L20-NM35 L20-NM37 L20-NM39	L20-NM45 L20-NM47	L20-NM55 L20-NM57 L20-NM59	L20-NM65 L20-NM67	L20-NM85 L20-NM87	L20-NM95	L20-NM05	L20-NM905	L20-NM005

Recommended Stones for BL20 and L20 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. Ra Surface Finish µm µin		Stone to use	Approx. Ra Surface Finish µm µin	
Deburring: rough holes, all materials						
	L20-A413	—	—	L20-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	L20-J57	1,38	55	L20-DM85	1,25	50
Brass, Soft	L20-J63	0,83	33	L20-J63	0,83	33
Bronze	L20-J57	1,38	55	L20-J57	1,38	55
Carbide	L20-DM55	0,50	20	L20-DM55	0,50	20
Cast Iron	L20-J57	0,50	20	L20-DM55	2,00	80
Ceramic	L20-DM55	1,00	40	L20-DM55	1,00	40
Glass	L20-DM55	1,75	70	L20-DM55	1,75	70
Steel, Soft	L20-A57	0,75	30	L20-NM55	1,25	50
Steel, Hardened*	L20-A55	0,30	12	L20-NM55	1,00	40
Steel, Hardened**	L20-A63	0,30	12	—	—	—
Steel, Very Hard***	L20-NM55	1,00	40	—	—	—
Fine finishing: previously honed holes						
Aluminum	L20-J95	0,30	12	L20-DM05	0,83	33
Brass, Soft	L20-J83	0,40	16	L20-J83	0,40	16
Bronze	L20-J95	0,30	12	L20-J95	0,30	12
Carbide	L20-DM05	0,08	3	L20-DM05	0,08	3
Cast Iron	L20-J95	0,13	5	L20-DM05	0,50	20
Ceramic	L20-DM05	0,38	15	L20-DM05	0,38	15
Glass	L20-DM05	0,38	15	L20-DM05	0,38	15
Steel, Soft	L20-J95	0,10	4	L20-NM05	0,40	16
Steel, Hardened	L20-J83	0,13	5	L20-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Automatic Size Control Probes

18,90mm - 31,75mm (.744"-1.250")

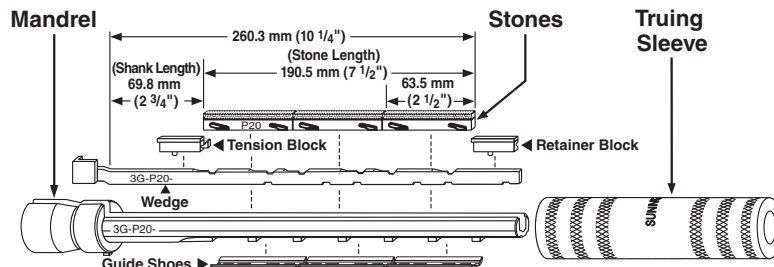
For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low		High	
ASC-0750	19	3/4	18,80	.740	19,28	.759
ASC-0766	19,45	49/64	19,20	.756	19,69	.775
ASC-0781	20	25/32	19,69	.775	20,17	.794
ASC-0797	20,24	51/64	19,99	.787	20,47	.806
ASC-0812	20,64	13/16	20,37	.802	20,85	.821
ASC-0828	21	53/64	20,78	.818	21,26	.837
ASC-0844	21,43	27/32	21,18	.834	21,67	.853
ASC-0859	22	55/64	21,67	.853	22,15	.872
ASC-0875	22,22	7/8	21,97	.865	22,45	.884
ASC-0891	22,62	57/64	22,38	.881	22,86	.900
ASC-0906	23	29/32	22,76	.896	23,24	.915
ASC-0922	23,42	59/64	23,17	.912	23,65	.931
ASC-0938	24	15/16	23,67	.932	24,16	.951
ASC-0953	24,21	61/64	23,95	.943	24,44	.962
ASC-0969	24,61	31/32	24,36	.959	24,84	.978
ASC-0984	25	63/64	24,69	.972	25,17	.991
ASC-1000	25,40	1	25,15	.990	25,63	1.010
ASC-1016	26	1-1/64	25,68	1.011	26,16	1.030

P20

3-Stone Honing Units

Diameter Range:
15,72 mm – 25,40 mm
.619" – 1.000"



NOTE: Mandrels can be used with fewer than 3 stones for shorter parts which require long reach.

NOTE: These honing units cannot be used for blind hole honing.

Order 1-4 For Complete 3-Stone P20 Honing Units

Diameter Range 15,72 mm - 25,40 mm .619" - 1.000"		1 P20 Mandrel Includes wedge, retainer block, tension block, and SUNALOY® guide shoes	2 Truing Sleeve	3 Alignment Bushing†	4 Honing Stone 3 required	Replacement Parts	
mm	inches			For machines with fully adjustable spindle nose		Guide Shoes 3 required, packed 2 per box Choose 1 Suffix	Guide Shoe Screws Flat Head Brass
15,72-16,66	.619-.656	3G-P20-625AS†*	ST-625	C-625	See All Stone Tables Page 2.45	Not Replaceable	
16,51-17,45	.650-.687	3G-P20-656AS†*	ST-656	C-650		Not Replaceable	
17,30-18,24	.681-.718	3G-P20-687AS†*	ST-687	C-681		Not Replaceable	
18,11-19,05	.713-.750	3G-P20-718AS†*	ST-718	C-713		Not Replaceable	
18,90-19,84	.744-.781	3G-P20-750UA†	ST-750	C-750		UA C B CH	LN-1547A 4 - 40 x 7/32"
19,68-20,62	.775-.812	3G-P20-781UA†	ST-780	C-812		UA C B CH	LN-1548A 4 - 40 x 1/4"
20,47-21,41	.806-.843	3G-P20-812UB†	ST-812	C-812		UB C B CH	
21,29-22,22	.838-.875	3G-P20-843UB†	ST-840	C-812		UB C B CH	
22,07-23,01	.869-.906	3G-P20-875UB†	ST-875	C-875		UB C B CH	
22,86-23,80	.900-.937	3G-P20-906UC†	ST-900	C-875		UC C B CH	
23,65-24,59	.931-.968	3G-P20-937UC†	ST-937	C-937		UC C B CH	
24,43-25,40	.962-1.000	3G-P20-968UC†	ST-960	C-937		UC C B CH	

Mandrel Options

† Requires the use of LN-570A Concentric Sleeve
* Shoes are soft steel, integral with mandrel.

‡ Alignment Bushings

Select the bushing whose bore diameter is just *under* finish size. When setting up the job for the first time, the undersize alignment bushing can be honed out to finish size with the same tooling used for honing the workpiece.

Guide Shoe Options

C= SUNALOY® General purpose shoe for most honing applications. Furnished with Mandrel.
B= Bronze for finer finishes and soft or difficult materials. Order separately.
CH= Hard steel for production honing or hard, rough parts or carbide, ceramic, etc. Order separately.

Additional Guide Shoes†

Carbide Inserted Guide Shoes	Diamond Plated Guide Shoes (120 Grit)	Metal Bond Superabrasive Inserted Guide Shoes
	Specify part finish diameter when ordering	Specify abrasive type, grit size, and hardness.
UA-B-TX†	UA-B- -DX†	UA-B- -JS2X†
UB-B-TX†	UB-B- -DX†	UB-B- -JS2X†
UC-B-TX†	UC-B- -DX†	UC-B- -JS2X†

Ex: UA-B-750-DX Ex: UA-B-NM89-JS2X (1 required—packed 1 per box).

P20 Mandrel Replacement Parts

3G-P20	Wedge
LN-1529A	Replace when wear <i>begins</i> to show
LN-1533A	Retainer Block with set screw
LN-1545A	Tension Block
	Set Screw only (Pkg. of 2)

Diamond Plated Super Mandrels†

Diamond plated, superabrasive stone inserted, or carbide guide shoe mandrel are available for situations where a longer life shoe is needed.

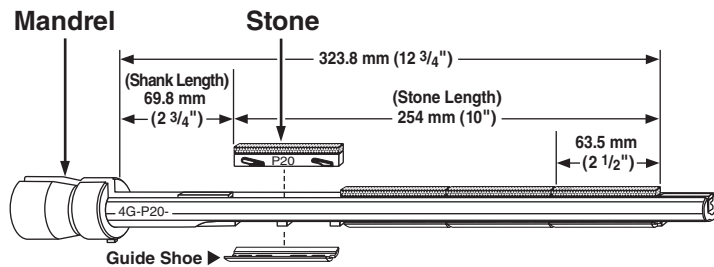
Automatic Size Control Probes

15,62mm - 25,63mm (.615"-1.010")

For use on machines with Automatic Size Control units. Select the appropriate size control probe based on workpiece finish diameter. See page 8.4 for complete list.

Sensing Tip Part No.	Nominal Diameter mm in	Diameter Range Low mm in High mm in	Sensing Tip Part No.	Nominal Diameter mm in	Diameter Range Low mm in High mm in
ASC-0625	15,88 5/8	15,62 .615 16,10 .634	ASC-0812	20,64 13/16	20,37 .802 20,85 .821
ASC-0630	16 -	15,75 .620 16,23 .639	ASC-0828	21 53/64	20,78 .818 21,26 .837
ASC-0641	16,27 41/64	16,03 .631 16,51 .650	ASC-0844	21,43 27/32	21,18 .834 21,67 .853
ASC-0656	16,67 21/32	16,41 .646 16,89 .665	ASC-0859	22 55/64	21,67 .853 22,15 .872
ASC-0672	17 43/64	16,79 .661 17,27 .680	ASC-0875	22,22 7/8	21,97 .865 22,45 .884
ASC-0688	17,46 11/16	17,22 .678 17,70 .697	ASC-0891	22,62 57/64	22,38 .881 22,86 .900
ASC-0703	18 45/64	17,70 .697 18,19 .716	ASC-0906	23 29/32	22,76 .896 23,24 .915
ASC-0719	18,26 23/32	18,01 .709 18,49 .728	ASC-0922	23,42 59/64	23,17 .912 23,65 .931
ASC-0734	18,65 47/64	18,39 .724 18,87 .743	ASC-0938	24 15/16	23,67 .932 24,16 .951
ASC-0750	19 3/4	18,80 .740 19,28 .759	ASC-0953	24,21 61/64	23,95 .943 24,44 .962
ASC-0766	19,45 49/64	19,20 .756 19,69 .775	ASC-0969	24,61 31/32	24,36 .959 24,84 .978
ASC-0781	20 25/32	19,69 .775 20,17 .794	ASC-0984	25 63/64	24,69 .972 25,17 .991
ASC-0797	20,24 51/64	19,99 .787 20,47 .806	ASC-1000	25,40 1	25,15 .990 25,63 1.010

† Special Order - Contact Customer Service



NOTE: Mandrels can be used with fewer than 4 stones for shorter parts which require long reach.

NOTE: These honing units cannot be used for blind hole honing.

P20

4-Stone Honing Units

Diameter Range:
15,72 mm – 25,40 mm
.619" – 1.000"

Order 1-4 For Complete 4-Stone P20 Honing Units

Diameter Range 15,72 mm - 25,40 mm .619" - 1.000"		1 P20 Mandrel Includes wedge, retainer block, tension block, and SUNALOY® guide shoes	2 Truing Sleeve	3 Alignment Bushing†	4 Honing Stone 4 required	Replacement Parts	
mm	inches			For machines with fully adjustable spindle nose		Guide Shoes 4 required, packed 2 per box Choose 1 Suffix	Guide Shoe Screws Flat Head Brass
15,72-16,66	.619-.656	4G-P20-625AS†*	ST-625	C-625	See All Stone Tables Page 2.45	Not Replaceable	
16,51-17,45	.650-.687	4G-P20-656AS†*	ST-656	C-650		Not Replaceable	
17,30-18,24	.681-.718	4G-P20-687AS†*	ST-687	C-681		Not Replaceable	
18,11-19,05	.713-.750	4G-P20-718AS†*	ST-718	C-713		Not Replaceable	
18,90-19,84	.744-.781	4G-P20-750UA†	ST-750	C-750		UA C B CH	LN-1547A 4 - 40 x 7/32"
19,68-20,62	.775-.812	4G-P20-781UA†	ST-780	C-812		UB C B CH	LN-1548A 4 - 40 x 1/4"
20,47-21,41	.806-.843	4G-P20-812UB†	ST-812	C-812		UB C B CH	
21,29-22,22	.838-.875	4G-P20-843UB†	ST-840	C-812		UB C B CH	
22,07-23,01	.869-.906	4G-P20-875UB†	ST-875	C-875		UB C B CH	
22,86-23,80	.900-.937	4G-P20-906UC†	ST-900	C-875		UC C B CH	
23,65-24,59	.931-.968	4G-P20-937UC†	ST-937	C-937		UC C B CH	
24,43-25,40	.962-1.000	4G-P20-968UC†	ST-960	C-937		UC C B CH	

Mandrel Options

† Requires the use of LN-570A Concentric Sleeve
* Shoes are soft steel, integral with mandrel.

‡ Alignment Bushings

Select the bushing whose bore diameter is just *under* finish size. When setting up the job for the first time, the undersize alignment bushing can be honed out to finish size with the same tooling used for honing the workpiece.

Guide Shoe Options

C= SUNALOY® General purpose shoe for most honing applications. Furnished with Mandrel.
B= Bronze for finer finishes and soft or difficult materials. Order separately.
CH= Hard steel for production honing or hard, rough parts or carbide, ceramic, etc. Order separately.

Additional Guide Shoes†

Carbide Inserted Guide Shoes	Diamond Plated Guide Shoes (120 Grit)	Metal Bond Superabrasive Inserted Guide Shoes
	Specify part finish, diameter when ordering	Specify abrasive type, grit size, and hardness.
UA-B-TX†	UA-B- -DX†	UA-B- -JS2X†
UB-B-TX†	UB-B- -DX†	UB-B- -JS2X†
UC-B-TX†	UC-B- -DX†	UC-B- -JS2X†

Ex: UA-B-750-DX Ex: UA-B-NM89-JS2X (4 required—packed 1 per box).

P20 Mandrel Replacement Parts

4G-P20	Wedge
LN-1529A	Replace when wear <i>begins</i> to show
LN-1533A	Retainer Block with set screw
LN-1545A	Tension Block
	Set Screw only (Pkg. of 2)

Diamond Plated Super Mandrels†

Diamond plated, superabrasive stone inserted, or carbide guide shoe mandrel are available for situations where a longer life shoe is needed.

Automatic Size Control Probes

15,62mm - 25,63mm (.615"-1.010")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on workpiece finish diameter. See page 8.4 for complete list.

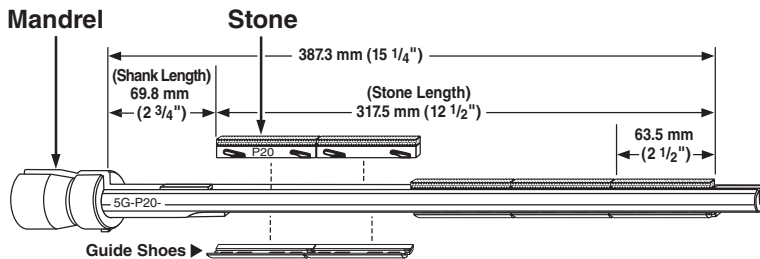
Sensing Tip Part No.	Nominal Diameter mm in	Diameter Range Low High mm in mm in	Sensing Tip Part No.	Nominal Diameter mm in	Diameter Range Low High mm in mm in
ASC-0625	15,88 5/8	15,62 .615 16,10 .634	ASC-0812	20,64 13/16	20,37 .802 20,85 .821
ASC-0630	16 —	15,75 .620 16,23 .639	ASC-0828	21 53/64	20,78 .818 21,26 .837
ASC-0641	16,27 41/64	16,03 .631 16,51 .650	ASC-0844	21,43 27/32	21,18 .834 21,67 .853
ASC-0656	16,67 21/32	16,41 .646 16,89 .665	ASC-0859	22 55/64	21,67 .853 22,15 .872
ASC-0672	17 43/64	16,79 .661 17,27 .680	ASC-0875	22,22 7/8	21,97 .865 22,45 .884
ASC-0688	17,46 11/16	17,22 .678 17,70 .697	ASC-0891	22,62 57/64	22,38 .881 22,86 .900
ASC-0703	18 45/64	17,70 .697 18,19 .716	ASC-0906	23 29/32	22,76 .896 23,24 .915
ASC-0719	18,26 23/32	18,01 .709 18,49 .728	ASC-0922	23,42 59/64	23,17 .912 23,65 .931
ASC-0734	18,65 47/64	18,39 .724 18,87 .743	ASC-0938	24 15/16	23,67 .932 24,16 .951
ASC-0750	19 3/4	18,80 .740 19,28 .759	ASC-0953	24,21 61/64	23,95 .943 24,44 .962
ASC-0766	19,45 49/64	19,20 .756 19,69 .775	ASC-0969	24,61 31/32	24,36 .959 24,84 .978
ASC-0781	20 25/32	19,69 .775 20,17 .794	ASC-0984	25 63/64	24,69 .972 25,17 .991
ASC-0797	20,24 51/64	19,99 .787 20,47 .806	ASC-1000	25,40 1	25,15 .990 25,63 1.010

† Special Order - Contact Customer Service

P20

5-Stone Honing Units

Diameter Range:
15,72 mm – 25,40 mm
.619" – 1.000"



NOTE: Mandrels can be used with fewer than 5 stones for shorter parts which require long reach.

NOTE: These honing units cannot be used for blind hole honing.

Order 1-4 For Complete 5-Stone P20 Honing Units

Diameter Range 15,72 mm - 25,40 mm .619" - 1.000"		1 P20 Mandrel Includes wedge, retainer block, tension block, and SUNALOV® guide shoes	2 Truing Sleeve	3 Alignment Bushing†	4 Honing Stone 5 required	Replacement Parts	
mm	inches			For machines with fully adjustable spindle nose.		Guide Shoes 1 required, packed 2 per box Choose 1 Suffix	Guide Shoe Screws Flat Head Brass
15,72-16,66	.619-.656	5G-P20-625AS†*	ST-625	C-625	See All Stone Tables At Right	Not Replaceable	
16,51-17,45	.650-.687	5G-P20-656AS†*	ST-656	C-650		Not Replaceable	
17,30-18,24	.681-.718	5G-P20-687AS†*	ST-687	C-681		Not Replaceable	
18,11-19,05	.713-.750	5G-P20-718AS†*	ST-718	C-713		Not Replaceable	
18,90-19,84	.744-.781	5G-P20-750UA†	ST-750	C-750		UA C B CH	LN-1547A
19,68-20,62	.775-.812	5G-P20-781UA†	ST-780	C-812		UA C B CH	4 - 40 x 7/32"
20,47-21,41	.806-.843	5G-P20-812UB†	ST-812	C-812		UB C B CH	LN-1548A 4 - 40 x 1/4"
21,29-22,22	.838-.875	5G-P20-843UB†	ST-840	C-812		UB C B CH	
22,07-23,01	.869-.906	5G-P20-875UB†	ST-875	C-875		UB C B CH	
22,86-23,80	.900-.937	5G-P20-906UC†	ST-900	C-875		UC C B CH	
23,65-24,59	.931-.968	5G-P20-937UC†	ST-937	C-937		UC C B CH	
24,43-25,40	.962-1.000	5G-P20-968UC†	ST-960	C-937		UC C B CH	

Mandrel Options

† Requires the use of LN-570A Concentric Sleeve
* Shoes are soft steel, integral with mandrel.

† Alignment Bushings

Select the bushing whose bore diameter is just *under* finish size. When setting up the job for the first time, the undersize alignment bushing can be honed out to finish size with the same tooling used for honing the workpiece.

Guide Shoe Options

C= SUNALOV® General purpose shoe for most honing applications. Furnished with Mandrel.
B= Bronze for finer finishes and soft or difficult materials. Order separately.
CH= Hard steel for production honing or hard, rough parts or carbide, ceramic, etc. Order separately.

Additional Guide Shoes†

Carbide Inserted Guide Shoes	Diamond Plated Guide Shoes (120 Grit)	Metal Bond Superabrasive Inserted Guide Shoes
	Specify part finish diameter when ordering	Specify abrasive type, grit size, and hardness.
UA-B-TX†	UA-B- -DX†	UA-B- -JS2X†
UB-B-TX†	UB-B- -DX†	UB-B- -JS2X†
UC-B-TX†	UC-B- -DX†	UC-B- -JS2X†

Ex: UA-B-750-DX Ex: UA-B-NM89-JS2X (1 required—packed 1 per box).

P20 Mandrel Replacement Parts

5G-P20	Wedge
LN-1529A	Replace when wear <i>begins</i> to show
LN-1533A	Retainer Block with set screw
LN-1545A	Tension Block
	Set Screw only (Pkg. of 2)

Extended Length P20 Mandrels

Available on a special order basis.

Diamond Plated Super Mandrels†

Diamond plated, superabrasive stone inserted, or carbide guide shoe mandrel are available for situations where a longer life shoe is needed.

Automatic Size Control Probes

15,62mm - 25,63mm (.615"-1.010")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on workpiece finish diameter. See page 8.4 for complete list.

Sensing Tip Part No.	Nominal Diameter mm in	Diameter Range Low mm in	High mm in	Sensing Tip Part No.	Nominal Diameter mm in	Diameter Range Low mm in	High mm in
ASC-0625	15,88 5/8	15,62 .615	16,10 .634	ASC-0812	20,64 13/16	20,37 .802	20,85 .821
ASC-0630	16 —	15,75 .620	16,23 .639	ASC-0828	21 53/64	20,78 .818	21,26 .837
ASC-0641	16,27 41/64	16,03 .631	16,51 .650	ASC-0844	21,43 27/32	21,18 .834	21,67 .853
ASC-0656	16,67 21/32	16,41 .646	16,89 .665	ASC-0859	22 55/64	21,67 .853	22,15 .872
ASC-0672	17 43/64	16,79 .661	17,27 .680	ASC-0875	22,22 7/8	21,97 .865	22,45 .884
ASC-0688	17,46 11/16	17,22 .678	17,70 .697	ASC-0891	22,62 57/64	22,38 .881	22,86 .900
ASC-0703	18 45/64	17,70 .697	18,19 .716	ASC-0906	23 29/32	22,76 .896	23,24 .915
ASC-0719	18,26 23/32	18,01 .709	18,49 .728	ASC-0922	23,42 59/64	23,17 .912	23,65 .931
ASC-0734	18,65 47/64	18,39 .724	18,87 .743	ASC-0938	24 15/16	23,67 .932	24,16 .951
ASC-0750	19 3/4	18,80 .740	19,28 .759	ASC-0953	24,21 61/64	23,95 .943	24,44 .962
ASC-0766	19,45 49/64	19,20 .756	19,69 .775	ASC-0969	24,61 31/32	24,36 .959	24,84 .978
ASC-0781	20 25/32	19,69 .775	20,17 .794	ASC-0984	25 63/64	24,69 .972	25,17 .991
ASC-0797	20,24 51/64	19,99 .787	20,47 .806	ASC-1000	25,40 1	25,15 .990	25,63 1.010

† Special Order - Contact Customer Service

P20

Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

†For best results, use with bronze guide shoes.

Available Stones

		Grit Size											
		70	80	100	150	220	280	320	400	500	600	900	1200
Hard-----Soft	Aluminum Oxide Stones (A) - 12 per box												
	P20-A27		P20-A43 P20-A45	P20-A55	P20-A63 P20-A65	P20-A77							
			P20-A47	P20-A57	P20-A67								
			P20-A49 P20-A411 P20-A413	P20-A59	P20-A69								
Hard-----Soft	Silicon Carbide Stones (J,C) - 12 per box												
	P20-J25		P20-J45	P20-J55	P20-J63 P20-J65		P20-J83 P20-J85	P20-J95	P20-C05†				
			P20-J47	P20-J57	P20-J67		P20-J87	P20-J97					
			P20-J49		P20-J69		P20-J89	P20-J99					
Hard-----Soft	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box												
		P20-DM35	P20-DMB45	P20-DM55			P20-DM85		P20-DM05				
				P20-DV57			P20-DV87		P20-DV07				
				P20-NR53 P20-NMG57			P20-NR83						
P20-NM35 P20-NM37			P20-NM45 P20-NM55 P20-NM57	P20-NM85			P20-NM05						

Recommended Stones for P20 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin	Stone to use	Approx. Ra Surface Finish μm	Approx. Ra Surface Finish μin
Deburring: rough holes, all materials						
	P20-A413	—	—	P20-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	P20-J57	1,38	55	P20-DM85	1,25	50
Brass, Soft	P20-J63	0,83	33	P20-J63	0,83	33
Bronze	P20-J57	1,38	55	P20-J57	1,38	55
Carbide	P20-DM55	0,50	20	P20-DM55	0,50	20
Cast Iron	P20-J57	0,50	20	P20-DM55	2,00	80
Ceramic	P20-DM55	1,00	40	P20-DM55	1,00	40
Glass	P20-DM55	1,75	70	P20-DM55	1,75	70
Steel, Soft	P20-A57	0,75	30	P20-NM55	1,25	50
Steel, Hardened*	P20-A55	0,30	12	P20-NM55	1,00	40
Steel, Hardened**	P20-A63	0,30	12	—	—	—
Steel, Very Hard***	P20-NM55	1,00	40	—	—	—
Fine finishing: previously honed holes						
Aluminum	P20-J95	0,30	12	P20-DM05	0,83	33
Brass, Soft	P20-J83	0,40	16	P20-J83	0,40	16
Bronze	P20-J95	0,30	12	P20-J95	0,30	12
Carbide	P20-DM05	0,08	3	P20-DM05	0,08	3
Cast Iron	P20-J95	0,13	5	P20-DM05	0,50	20
Ceramic	P20-DM05	0,38	15	P20-DM05	0,38	15
Glass	P20-DM05	0,38	15	P20-DM05	0,38	15
Steel, Soft	P20-J95	0,10	4	P20-NM05	0,40	16
Steel, Hardened	P20-J83	0,13	5	P20-NM05	0,18	7

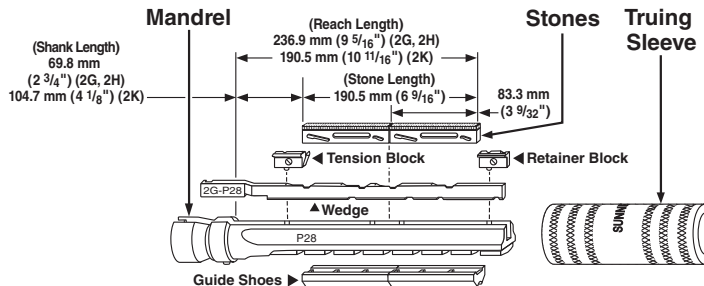
* 1st choice
 ** 2nd choice. Use if A55 does not cut.
 *** 3rd choice. Use if A63 does not cut.



P28

2-Stone Honing Units

Diameter Range:
25,15 mm – 152,40 mm
.990" – 6"



NOTE: Mandrels can be used with one stone for shorter parts which require long reach.

Open Hole: Order 1, 2, 5 For Complete P28 2-Stone Honing Units
Blind Hole: Order 1, 2, 4, 6 For Complete P28 2-Stone Honing Units

Diameter Range 25,15 mm - 152,40 mm .990" - 6"		1 P28 Mandrel Assembled for open hole work. Includes Wedge and Guide Shoes	2 Truing Sleeve	3 Replacement Guide Shoes 2 required SC and SD Guide Shoes Order 2 Guide Shoes per number of stones used	4 Wedge Blind Hole Replace When Wear Begins To Show	Honing Stone				
mm	inches			Sunaloy	Zinc	Bronze	Hard Steel	Diamond Plated		
25,15-26,97	.990-1.062	2G-P28-1000VA†	ST-1000	VA-C\$		VA-B	VA-CH	VA-BD	2G-R28	5 Open Hole See P28 Open Hole Table on Page 2.50.
26,72-28,58	1.052-1.125	2G-P28-1062VA†	ST-1062	VA-C\$		VA-B	VA-CH	VA-BD	2G-R28	
28,32-30,15	1.115-1.187	2G-P28-1125VB†	ST-1125	VB-C\$		VB-B	VB-CH	VB-BD	2G-R28	
29,90-31,75	1.177-1.250	2G-P28-1187VB†	ST-1187	VB-C\$		VB-B	VB-CH	VB-BD	2G-R28	
31,24-34,93	1.230-1.375	2G-P28-1250WB†	ST-1250		WB-D\$	WB-B	WB-DH	WB-BD	2G-R28	
34,42-38,10	1.355-1.500	2G-P28-1375WC†	ST-1375		WC-D\$	WC-B	WC-DH	WC-BD	2G-R28	6 Blind Hole See R28 Blind Hole Table on Page 2.51.
37,59-41,28	1.480-1.625	2G-P28-1500WD†	ST-1500		WD-D\$	WD-B	WD-DH	WD-BD	2G-R28	
40,77-44,45	1.605-1.750	2G-P28-1625WD†	ST-1600		WD-D\$	WD-B	WD-DH	WD-BD	2G-R28	
43,94-47,63	1.730-1.875	2G-P28-1750WE	ST-1700		WE-D\$	WE-B	WE-DH	WE-BD	2G-R28	
47,18-50,80	1.855-2.000	2H-P28-1875WE	ST-1875		WE-D\$	WE-B	WE-DH	WE-BD	2H-R28	
50,29-53,98	1.980-2.125	2H-P28-2000WF	ST-2000		WF-D\$	WF-B	WF-DH	WF-BD	2H-R28	
53,47-57,15	2.105-2.250	2H-P28-2125WF	ST-2100		WF-D\$	WF-B	WF-DH	WF-BD	2H-R28	
56,64-60,33	2.230-2.375	2H-P28-2250WF	ST-2200		WF-D\$	WF-B	WF-DH	WF-BD	2H-R28	
59,81-63,50	2.355-2.500	2H-P28-2375WG	ST-2375		WG-D\$	WG-B	WG-DH	WG-BD	2H-R28	
62,99-66,68	2.480-2.625	2H-P28-2500WG	ST-2500		WG-D\$	WG-B	WG-DH	WG-BD	2H-R28	
66,17-69,85	2.605-2.750	2K-P28-2625SC	ST-2625			SC-B\$	SC-BH	SC-B-DX+	2K-R28-1	
69,34-73,03	2.730-2.875	2K-P28-2750SC	ST-2750			SC-B\$	SC-BH	SC-B-DX+	2K-R28-1	
72,52-76,20	2.855-3.000	2K-P28-2875SC	ST-2875			SC-B\$	SC-BH	SC-B-DX+	2K-R28-1	
75,69-79,38	2.980-3.125	2K-P28-3000SC	ST-3000			SC-B\$	SC-BH	SC-B-DX+	2K-R28-1	
78,87-82,55	3.105-3.250	2K-P28-3125SD	ST-3125			SD-B\$	SD-BH	SD-B-DX+	2K-R28-1	
82,04-85,73	3.230-3.375	2K-P28-3250SD+	ST-3250			SD-B\$	SD-BH	SD-B-DX+	2K-R28-1	
85,22-88,90	3.355-3.500	2K-P28-3375SD+	ST-3375			SD-B\$	SD-BH	SD-B-DX+	2K-R28-1	
88,39-92,08	3.480-3.625	2K-P28-3500SD+	ST-3500			SD-B\$	SD-BH	SD-B-DX+	2K-R28-1	
91,57-95,25	3.605-3.750	2K-P28-3625SD+	ST-3625			SD-B\$	SD-BH	SD-B-DX+	2K-R28-1	
94,74-98,43	3.730-3.875	2K-P28-3750SD+	ST-3750			SD-B\$	SD-BH	SD-B-DX+	2K-R28-1	
97,92-101,60	3.855-4.000	2K-P28-3875SD+	ST-3875+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-2+	
101,09-104,78	3.980-4.125	2K-P28-4000SD+	ST-4000+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-2+	
104,27-107,95	4.105-4.250	2K-P28-4125SD+	ST-4125+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-2+	
107,44-111,13	4.230-4.375	2K-P28-4250SD+	ST-4250+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-2+	
110,62-114,30	4.355-4.500	2K-P28-4375SD+	ST-4375+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-2+	
113,79-117,48	4.480-4.625	2K-P28-4500SD+	ST-4500+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-2+	
116,97-120,65	4.605-4.750	2K-P28-4625SD+	ST-4625+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-2+	
120,14-123,83	4.730-4.875	2K-P28-4750SD+	ST-4750+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-2+	
123,32-127,00	4.855-5.000	2K-P28-4875SD+	ST-4875+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-2+	
126,49-130,18	4.980-5.125	2K-P28-5000SD+	ST-5000+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-2+	
129,67-133,35	5.105-5.250	2K-P28-5125SD+	ST-5125+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-3+	
132,84-136,53	5.230-5.375	2K-P28-5250SD+	ST-5250+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-3+	
136,02-139,70	5.355-5.500	2K-P28-5375SD+	ST-5375+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-3+	
139,19-142,88	5.480-5.625	2K-P28-5500SD+	ST-5500+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-3+	
142,37-146,05	5.605-5.750	2K-P28-5625SD+	ST-5625+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-3+	
145,54-149,23	5.730-5.875	2K-P28-5750SD+	ST-5750+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-3+	
148,72-152,40	5.855-6.000	2K-P28-5875SD+	ST-5875+			SD-B\$	SD-BH	SD-B-DX+	2K-R28-3+	

**5 Open
Hole**
See P28
Open Hole
Table on
Page 2.50.

**6 Blind
Hole**
See R28
Blind Hole
Table on
Page 2.51.

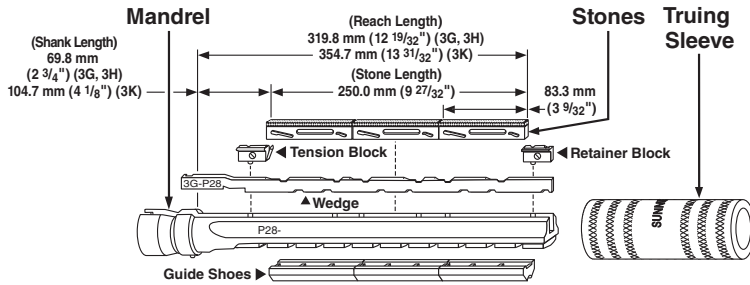
Sunaloy® General purpose shoe for most honing applications **Furnished with Mandrel.**
Zinc For most honing operations except fine finish **Furnished with Mandrel.**
Bronze For finer finishes and soft or difficult materials **Order separately.**
Hard Steel For production honing or hard, rough parts or carbide, ceramic, etc **Order separately.**
Diamond Plated For fast stock removal and longer shoe life (120 grit) **Order separately.**

† Requires use of LN570A Concentric Sleeve.
§ Supplied with Mandrel. All others, order separately.
+ Special Order - Contact Customer Service

P28

3-Stone Honing Units

Diameter Range:
25,15 mm – 152,40 mm
.990" – 6"



NOTE: Mandrels can be used with fewer than 3 stones for shorter parts which require long reach.

Open Hole: Order 1, 2, 5 For Complete P28 3-Stone Honing Units
Blind Hole: Order 1, 2, 4, 6 For Complete P28 3-Stone Honing Units

Diameter Range 25,15 mm - 152,40 mm .990" - 6"		1 P28 Mandrel Assembled for open hole work. Includes Wedge and Guide Shoes	2 Truing Sleeve	3 Replacement Guide Shoes 3 required SC and SD Guide Shoes Order 2 Guide Shoes per number of stones used	4 Wedge Blind Hole Replace When Wear Begins To Show	Honing Stone				
mm	inches			Sunaloy	Zinc	Bronze	Hard Steel	Diamond Plated		
25,15-26,97	.990-1.062	3G-P28-1000VA†	ST-1000	VA-C\$		VA-B	VA-CH	VA-BD	3G-R28	5 Open Hole See P28 Open Hole Table on Page 2.50.
26,72-28,58	1.052-1.125	3G-P28-1062VA†	ST-1062	VA-C\$		VA-B	VA-CH	VA-BD	3G-R28	
28,32-30,15	1.115-1.187	3G-P28-1125VB†	ST-1125	VB-C\$		VB-B	VB-CH	VB-BD	3G-R28	
29,90-31,75	1.177-1.250	3G-P28-1187VB†	ST-1187	VB-C\$		VB-B	VB-CH	VB-BD	3G-R28	
31,24-34,93	1.230-1.375	3G-P28-1250WB†	ST-1250		WB-D\$	WB-B	WB-DH	WB-BD	3G-R28	
34,42-38,10	1.355-1.500	3G-P28-1375WC†	ST-1375		WC-D\$	WC-B	WC-DH	WC-BD	3G-R28	
37,59-41,28	1.480-1.625	3G-P28-1500WD†	ST-1500		WD-D\$	WD-B	WD-DH	WD-BD	3G-R28	
40,77-44,45	1.605-1.750	3G-P28-1625WD†	ST-1600		WD-D\$	WD-B	WD-DH	WD-BD	3G-R28	
43,94-47,63	1.730-1.875	3G-P28-1750WE	ST-1700		WE-D\$	WE-B	WE-DH	WE-BD	3G-R28	
47,18-50,80	1.855-2.000	3H-P28-1875WE	ST-1875		WE-D\$	WE-B	WE-DH	WE-BD	3H-R28	
50,29-53,98	1.980-2.125	3H-P28-2000WF	ST-2000		WF-D\$	WF-B	WF-DH	WF-BD	3H-R28	6 Blind Hole See R28 Blind Hole Table on Page 2.51.
53,47-57,15	2.105-2.250	3H-P28-2125WF	ST-2100		WF-D\$	WF-B	WF-DH	WF-BD	3H-R28	
56,64-60,33	2.230-2.375	3H-P28-2250WF	ST-2200		WF-D\$	WF-B	WF-DH	WF-BD	3H-R28	
59,81-63,50	2.355-2.500	3H-P28-2375WG	ST-2375		WG-D\$	WG-B	WG-DH	WG-BD	3H-R28	
62,99-66,68	2.480-2.625	3H-P28-2500WG	ST-2500		WG-D\$	WG-B	WG-DH	WG-BD	3H-R28	
66,17-69,85	2.605-2.750	3K-P28-2625SC†	ST-2625			SC-B\$	SC-BH	SC-B-DX†	3K-R28-1	
69,34-73,03	2.730-2.875	3K-P28-2750SC†	ST-2750			SC-B\$	SC-BH	SC-B-DX†	3K-R28-1	
72,52-76,20	2.855-3.000	3K-P28-2875SC†	ST-2875			SC-B\$	SC-BH	SC-B-DX†	3K-R28-1	
75,69-79,38	2.980-3.125	3K-P28-3000SC†	ST-3000			SC-B\$	SC-BH	SC-B-DX†	3K-R28-1	
78,87-82,55	3.105-3.250	3K-P28-3125SD†	ST-3125			SD-B\$	SD-BH	SD-B-DX†	3K-R28-1	
82,04-85,73	3.230-3.375	3K-P28-3250SD†	ST-3250			SD-B\$	SD-BH	SD-B-DX†	3K-R28-1	
85,22-88,90	3.355-3.500	3K-P28-3375SD†	ST-3375			SD-B\$	SD-BH	SD-B-DX†	3K-R28-1	
88,39-92,08	3.480-3.625	3K-P28-3500SD†	ST-3500			SD-B\$	SD-BH	SD-B-DX†	3K-R28-1	
91,57-95,25	3.605-3.750	3K-P28-3625SD†	ST-3625			SD-B\$	SD-BH	SD-B-DX†	3K-R28-1	
94,74-98,43	3.730-3.875	3K-P28-3750SD†	ST-3750			SD-B\$	SD-BH	SD-B-DX†	3K-R28-1	
97,92-101,60	3.855-4.000	3K-P28-3875SD†	ST-3875†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-2†	
101,09-104,78	3.980-4.125	3K-P28-4000SD†	ST-4000†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-2†	
104,27-107,95	4.105-4.250	3K-P28-4125SD†	ST-4125†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-2†	
107,44-111,13	4.230-4.375	3K-P28-4250SD†	ST-4250†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-2†	
110,62-114,30	4.355-4.500	3K-P28-4375SD†	ST-4375†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-2†	
113,79-117,48	4.480-4.625	3K-P28-4500SD†	ST-4500†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-2†	
116,97-120,65	4.605-4.750	3K-P28-4625SD†	ST-4625†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-2†	
120,14-123,83	4.730-4.875	3K-P28-4750SD†	ST-4750†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-2†	
123,32-127,00	4.855-5.000	3K-P28-4875SD†	ST-4875†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-2†	
126,49-130,18	4.980-5.125	3K-P28-5000SD†	ST-5000†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-2†	
129,67-133,35	5.105-5.250	3K-P28-5125SD†	ST-5125†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-3†	
132,84-136,53	5.230-5.375	3K-P28-5250SD†	ST-5250†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-3†	
136,02-139,70	5.355-5.500	3K-P28-5375SD†	ST-5375†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-3†	
139,19-142,88	5.480-5.625	3K-P28-5500SD†	ST-5500†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-3†	
142,37-146,05	5.605-5.750	3K-P28-5625SD†	ST-5625†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-3†	
145,54-149,23	5.730-5.875	3K-P28-5750SD†	ST-5750†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-3†	
148,72-152,40	5.855-6.000	3K-P28-5875SD†	ST-5875†			SD-B\$	SD-BH	SD-B-DX†	3K-R28-3†	

Sunloy® General purpose shoe for most honing applications Furnished with Mandrel.
Zinc For most honing operations except fine finish Furnished with Mandrel.
Bronze For finer finishes and soft or difficult materials Order separately.
Hard Steel For production honing or hard, rough parts or carbide, ceramic, etc Order separately.
Diamond Plated For fast stock removal and longer shoe life (120 grit) Order separately.

† Requires use of LN570A Concentric Sleeve.

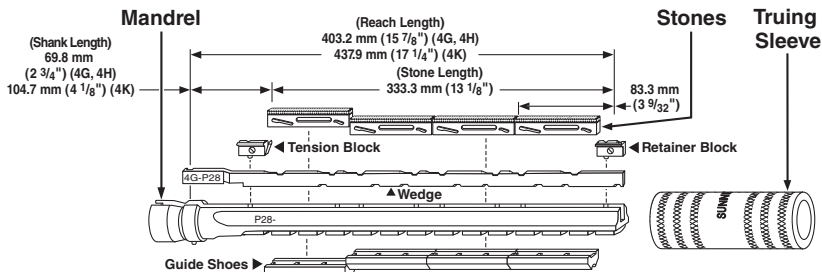
\$ Supplied with Mandrel. All others, order separately.

+ Special Order - Contact Customer Service

P28

4-Stone Honing Units

Diameter Range:
25,15 mm – 152,40 mm
.990" – 6"



NOTE: Mandrels can be used with fewer than 4 stones for shorter parts which require long reach.

Open Hole: Order 1, 2, 5 For Complete P28 4-Stone Honing Units
Blind Hole: Order 1, 2, 4, 6 For Complete P28 4-Stone Honing Units

Diameter Range 25,15 mm - 152,40 mm .990" - 6"		1 P28 Mandrel Assembled for open hole work. Includes Wedge and Guide Shoes	2 Truing Sleeve	3 Replacement Guide Shoes 4 required SC and SD Guide Shoes Order 2 Guide Shoes per number of stones used	4 Wedge Blind Hole Replace When Wear Begins To Show	Honing Stone			
mm	inches			Sunaloy	Zinc	Bronze	Hard Steel	Diamond Plated	
25,15-26,97	.990-1.062	4G-P28-1000VA†	ST-1000	VA-C\$		VA-B	VA-CH	VA-BD	4G-R28
26,72-28,58	1.052-1.125	4G-P28-1062VA†	ST-1062	VA-C\$		VA-B	VA-CH	VA-BD	4G-R28
28,32-30,15	1.115-1.187	4G-P28-1125VB†	ST-1125	VB-C\$		VB-B	VB-CH	VB-BD	4G-R28
29,90-31,75	1.177-1.250	4G-P28-1187VB†	ST-1187	VB-C\$		VB-B	VB-CH	VB-BD	4G-R28
31,24-34,93	1.230-1.375	4G-P28-1250WB†	ST-1250		WB-D\$	WB-B	WB-DH	WB-BD	4G-R28
34,42-38,10	1.355-1.500	4G-P28-1375WC†	ST-1375		WC-D\$	WC-B	WC-DH	WC-BD	4G-R28
37,59-41,28	1.480-1.625	4G-P28-1500WD†	ST-1500		WD-D\$	WD-B	WD-DH	WD-BD	4G-R28
40,77-44,45	1.605-1.750	4G-P28-1625WD†	ST-1600		WD-D\$	WD-B	WD-DH	WD-BD	4G-R28
43,94-47,63	1.730-1.875	4G-P28-1750WE	ST-1700		WE-D\$	WE-B	WE-DH	WE-BD	4G-R28
47,18-50,80	1.855-2.000	4H-P28-1875WE	ST-1875		WE-D\$	WE-B	WE-DH	WE-BD	4H-R28
50,29-53,98	1.980-2.125	4H-P28-2000WF	ST-2000		WF-D\$	WF-B	WF-DH	WF-BD	4H-R28
53,47-57,15	2.105-2.250	4H-P28-2125WF	ST-2100		WF-D\$	WF-B	WF-DH	WF-BD	4H-R28
56,64-60,33	2.230-2.375	4H-P28-2250WF	ST-2200		WF-D\$	WF-B	WF-DH	WF-BD	4H-R28
59,81-63,50	2.355-2.500	4H-P28-2375WG	ST-2375		WG-D\$	WG-B	WG-DH	WG-BD	4H-R28
62,99-66,68	2.480-2.625	4H-P28-2500WG	ST-2500		WG-D\$	WG-B	WG-DH	WG-BD	4H-R28
66,17-69,85	2.605-2.750	4K-P28-2625SC†	ST-2625			SC-B\$	SC-BH	SC-B-DX†	4K-R28-1†
69,34-73,03	2.730-2.875	4K-P28-2750SC†	ST-2750			SC-B\$	SC-BH	SC-B-DX†	4K-R28-1†
72,52-76,20	2.855-3.000	4K-P28-2875SC†	ST-2875			SC-B\$	SC-BH	SC-B-DX†	4K-R28-1†
75,69-79,38	2.980-3.125	4K-P28-3000SC†	ST-3000			SC-B\$	SC-BH	SC-B-DX†	4K-R28-1†
78,87-82,55	3.105-3.250	4K-P28-3125SD†	ST-3125			SD-B\$	SD-BH	SD-B-DX†	4K-R28-1†
82,04-85,73	3.230-3.375	4K-P28-3250SD†	ST-3250			SD-B\$	SD-BH	SD-B-DX†	4K-R28-1†
85,22-88,90	3.355-3.500	4K-P28-3375SD†	ST-3375			SD-B\$	SD-BH	SD-B-DX†	4K-R28-1†
88,39-92,08	3.480-3.625	4K-P28-3500SD†	ST-3500			SD-B\$	SD-BH	SD-B-DX†	4K-R28-1†
91,57-95,25	3.605-3.750	4K-P28-3625SD†	ST-3625			SD-B\$	SD-BH	SD-B-DX†	4K-R28-1†
94,74-98,43	3.730-3.875	4K-P28-3750SD†	ST-3750			SD-B\$	SD-BH	SD-B-DX†	4K-R28-1†
97,92-101,60	3.855-4.000	4K-P28-3875SD†	ST-3875†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-2†
101,09-104,78	3.980-4.125	4K-P28-4000SD†	ST-4000†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-2†
104,27-107,95	4.105-4.250	4K-P28-4125SD†	ST-4125†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-2†
107,44-111,13	4.230-4.375	4K-P28-4250SD†	ST-4250†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-2†
110,62-114,30	4.355-4.500	4K-P28-4375SD†	ST-4375†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-2†
113,79-117,48	4.480-4.625	4K-P28-4500SD†	ST-4500†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-2†
116,97-120,65	4.605-4.750	4K-P28-4625SD†	ST-4625†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-2†
120,14-123,83	4.730-4.875	4K-P28-4750SD†	ST-4750†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-2†
123,32-127,00	4.855-5.000	4K-P28-4875SD†	ST-4875†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-2†
126,49-130,18	4.980-5.125	4K-P28-5000SD†	ST-5000†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-2†
129,67-133,35	5.105-5.250	4K-P28-5125SD†	ST-5125†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-3†
132,84-136,53	5.230-5.375	4K-P28-5250SD†	ST-5250†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-3†
136,02-139,70	5.355-5.500	4K-P28-5375SD†	ST-5375†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-3†
139,19-142,88	5.480-5.625	4K-P28-5500SD†	ST-5500†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-3†
142,37-146,05	5.605-5.750	4K-P28-5625SD†	ST-5625†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-3†
145,54-149,23	5.730-5.875	4K-P28-5750SD†	ST-5750†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-3†
148,72-152,40	5.855-6.000	4K-P28-5875SD†	ST-5875†			SD-B\$	SD-BH	SD-B-DX†	4K-R28-3†

5

Open Hole

See P28 Open Hole Table on Page 2.50.

6

Blind Hole

See R28 Blind Hole Table on Page 2.51.

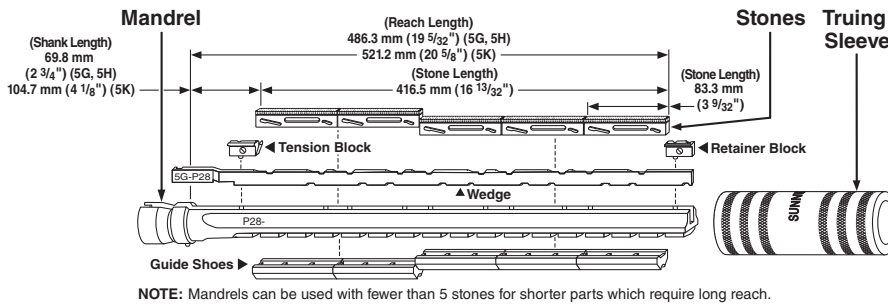
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Diamond Plated For fast stock removal and longer shoe life (120 grit) Order separately.

† Requires use of LN570A Concentric Sleeve.
§ Supplied with Mandrel. All others, order separately.
+ Special Order - Contact Customer Service

P28

5-Stone Honing Units

Diameter Range:
25,15 mm – 152,40 mm
.990" – 6"



Open Hole: Order 1, 2, 4 For Complete P28 5-Stone Honing Units
Blind Hole: Order 1, 2, 3, 5 For Complete P28 5-Stone Honing Units

Diameter Range 25,15 mm - 152,40 mm .990" - 6"		1 P28 Mandrel Assembled for open hole work. Includes Wedge and Guide Shoes	2 Truing Sleeve	3 Replacement Guide Shoes 5 required SC and SD Guide Shoes Order 2 Guide Shoes per number of stones used					4 Wedge Blind Hole Replace When Wear Begins To Show	Honing Stone
mm	inches			Sunloy	Zinc	Bronze	Hard Steel	Diamond Plated		
25,15-26,97	.990-1.062	5G-P28-1000VA†	ST-1000	VA-C§		VA-B	VA-CH	VA-BD	5G-R28	5 Open Hole See P28 Open Hole Table on Page 2.50.
26,72-28,58	1.052-1.125	5G-P28-1062VA†	ST-1062	VA-C§		VA-B	VA-CH	VA-BD	5G-R28	
28,32-30,15	1.115-1.187	5G-P28-1125VB†	ST-1125	VB-C§		VB-B	VB-CH	VB-BD	5G-R28	
29,90-31,75	1.177-1.250	5G-P28-1187VB†	ST-1187	VB-C§		VB-B	VB-CH	VB-BD	5G-R28	
31,24-34,93	1.230-1.375	5G-P28-1250WB†	ST-1250		WB-D§	WB-B	WB-DH	WB-BD	5G-R28	
34,42-38,10	1.355-1.500	5G-P28-1375WC†	ST-1375		WC-D§	WC-B	WC-DH	WC-BD	5G-R28	
37,59-41,28	1.480-1.625	5G-P28-1500WD†	ST-1500		WD-D§	WD-B	WD-DH	WD-BD	5G-R28	
40,77-44,45	1.605-1.750	5G-P28-1625WD†	ST-1600		WD-D§	WD-B	WD-DH	WD-BD	5G-R28	
43,94-47,63	1.730-1.875	5G-P28-1750WE	ST-1700		WE-D§	WE-B	WE-DH	WE-BD	5G-R28	
47,18-50,80	1.855-2.000	5H-P28-1875WE	ST-1875		WE-D§	WE-B	WE-DH	WE-BD	5H-R28	6 Blind Hole See R28 Blind Hole Table on Page 2.51.
50,29-53,98	1.980-2.125	5H-P28-2000WF	ST-2000		WF-D§	WF-B	WF-DH	WF-BD	5H-R28	
53,47-57,15	2.105-2.250	5H-P28-2125WF	ST-2100		WF-D§	WF-B	WF-DH	WF-BD	5H-R28	
56,64-60,33	2.230-2.375	5H-P28-2250WF	ST-2200		WF-D§	WF-B	WF-DH	WF-BD	5H-R28	
59,81-63,50	2.355-2.500	5H-P28-2375WG	ST-2375		WG-D§	WG-B	WG-DH	WG-BD	5H-R28	
62,99-66,68	2.480-2.625	5H-P28-2500WG†	ST-2500		WG-D§	WG-B	WG-DH	WG-BD	5H-R28	
66,17-69,85	2.605-2.750	5K-P28-2625SC†	ST-2625			SC-B§	SC-BH	SC-B-DX†	5K-R28-1†	
69,34-73,03	2.730-2.875	5K-P28-2750SC†	ST-2750			SC-B§	SC-BH	SC-B-DX†	5K-R28-1†	
72,52-76,20	2.855-3.000	5K-P28-2875SC†	ST-2875			SC-B§	SC-BH	SC-B-DX†	5K-R28-1†	
75,69-79,38	2.980-3.125	5K-P28-3000SC†	ST-3000			SC-B§	SC-BH	SC-B-DX†	5K-R28-1†	
78,87-82,55	3.105-3.250	5K-P28-3125SD†	ST-3125			SD-B§	SD-BH	SD-B-DX†	5K-R28-1†	
82,04-85,73	3.230-3.375	5K-P28-3250SD†	ST-3250			SD-B§	SD-BH	SD-B-DX†	5K-R28-1†	
85,22-88,90	3.355-3.500	5K-P28-3375SD†	ST-3375			SD-B§	SD-BH	SD-B-DX†	5K-R28-1†	
88,39-92,08	3.480-3.625	5K-P28-3500SD†	ST-3500			SD-B§	SD-BH	SD-B-DX†	5K-R28-1†	
91,57-95,25	3.605-3.750	5K-P28-3625SD†	ST-3625			SD-B§	SD-BH	SD-B-DX†	5K-R28-1†	
94,74-98,43	3.730-3.875	5K-P28-3750SD†	ST-3750			SD-B§	SD-BH	SD-B-DX†	5K-R28-1†	
97,92-101,60	3.855-4.000	5K-P28-3875SD†	ST-3875†			SD-B§	SD-BH	SD-B-DX†	5K-R28-2†	
101,09-104,78	3.980-4.125	5K-P28-4000SD†	ST-4000†			SD-B§	SD-BH	SD-B-DX†	5K-R28-2†	
104,27-107,95	4.105-4.250	5K-P28-4125SD†	ST-4125†			SD-B§	SD-BH	SD-B-DX†	5K-R28-2†	
107,44-111,13	4.230-4.375	5K-P28-4250SD†	ST-4250†			SD-B§	SD-BH	SD-B-DX†	5K-R28-2†	
110,62-114,30	4.355-4.500	5K-P28-4375SD†	ST-4375†			SD-B§	SD-BH	SD-B-DX†	5K-R28-2†	
113,79-117,48	4.480-4.625	5K-P28-4500SD†	ST-4500†			SD-B§	SD-BH	SD-B-DX†	5K-R28-2†	
116,97-120,65	4.605-4.750	5K-P28-4625SD†	ST-4625†			SD-B§	SD-BH	SD-B-DX†	5K-R28-2†	
120,14-123,83	4.730-4.875	5K-P28-4750SD†	ST-4750†			SD-B§	SD-BH	SD-B-DX†	5K-R28-2†	
123,32-127,00	4.855-5.000	5K-P28-4875SD†	ST-4875†			SD-B§	SD-BH	SD-B-DX†	5K-R28-2†	
126,49-130,18	4.980-5.125	5K-P28-5000SD†	ST-5000†			SD-B§	SD-BH	SD-B-DX†	5K-R28-2†	
129,67-133,35	5.105-5.250	5K-P28-5125SD†	ST-5125†			SD-B§	SD-BH	SD-B-DX†	5K-R28-3†	
132,84-136,53	5.230-5.375	5K-P28-5250SD†	ST-5250†			SD-B§	SD-BH	SD-B-DX†	5K-R28-3†	
136,02-139,70	5.355-5.500	5K-P28-5375SD†	ST-5375†			SD-B§	SD-BH	SD-B-DX†	5K-R28-3†	
139,19-142,88	5.480-5.625	5K-P28-5500SD†	ST-5500†			SD-B§	SD-BH	SD-B-DX†	5K-R28-3†	
142,37-146,05	5.605-5.750	5K-P28-5625SD†	ST-5625†			SD-B§	SD-BH	SD-B-DX†	5K-R28-3†	
145,54-149,23	5.730-5.875	5K-P28-5750SD†	ST-5750†			SD-B§	SD-BH	SD-B-DX†	5K-R28-3†	
148,72-152,40	5.855-6.000	5K-P28-5875SD†	ST-5875†			SD-B§	SD-BH	SD-B-DX†	5K-R28-3†	

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Diamond Plated For fast stock removal and longer shoe life (120 grit) Order separately.

† Requires use of LN570A Concentric Sleeve.
§ Supplied with Mandrel. All others, order separately.
+ Special Order - Contact Customer Service

Open Hole P28 Honing Stones

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require hard stones; soft materials require soft stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

†For best results, use with bronze guide shoes.

Available Stones

Grit Size

70 80 100 150 220 280 320 400 500 600 900 1200

Hard-----Soft

Hard-----Soft

Hard-----Soft

Aluminum Oxide Stones (A) - 12 per box

	P28-A23 P28-A25		P28-A43 P28-A45	P28-A53 P28-A55 P28-A56 P28-A57 P28-A58 P28-A59	P28-A61 P28-A63 P28-A65	P28-A73 P28-A75					
	P28-A27 P28-A28		P28-A47 P28-A49		P28-A67 P28-A68 P28-A69	P28-A77 P28-A79					
			P28-A411 P28-A413								

Silicon Carbide Stones (J,C) - 12 per box

	P28-J25 P28-J27		P28-J45 P28-J47 P28-J49	P28-J55 P28-J57 P28-J59	P28-J63 P28-J65 P28-J67 P28-J69 P28-J611		P28-J83 P28-J85 P28-J87 P28-J89	P28-J93 P28-J95 P28-J97 P28-J99	P28-CO5†		
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Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitriified (V) Bond - 1 per box

		P28-DM35	P28-DMB45 P28-DM45	P28-DM55 P28-DM57	P28-DM65		P28-DM85 P28-DM87	MP28-DM95 P28-DM95	MP28-DM05 P28-DM05	P28-DM905	P28-DR007 P28-DM005
			P28-DV47	P28-DV57			P28-DV87		P28-DV07		
				P28-NR51 P28-NR53			P28-NR83				
		HP28-NM35		HP28-NM55 P28-NMG55 P28-NMG57					P28-NMG05 P28-NM05	P28-NM905	P28-NM005
P28-NM15 P28-NM17		P28-NM35 P28-NM37	P28-NM45 P28-NM47	P28-NM55 P28-NM57 P28-NM59	P28-NM65 P28-NM67		P28-NM85 P28-NM87	P28-NM95			

Recommended Stones for Open Hole P28 Honing Units

Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _a Surface Finish µm µin		Stone to use	Approx. R _a Surface Finish µm µin	
Deburring: rough holes, all materials						
	P28-A413	—	—	P28-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	P28-J57	1,38	55	P28-DM85	1,25	50
Brass, Soft	P28-J63	0,83	33	P28-J63	0,83	33
Bronze	P28-J57	1,38	55	P28-J57	1,38	55
Carbide	P28-DM55	0,50	20	P28-DM55	0,50	20
Cast Iron	P28-J57	0,50	20	P28-DM55	2,00	80
Ceramic	P28-DM55	1,00	40	P28-DM55	1,00	40
Glass	P28-DM55	1,75	70	P28-DM55	1,75	70
Steel, Soft	P28-A57	0,75	30	P28-NM55	1,25	50
Steel, Hardened*	P28-A55	0,30	12	P28-NM55	1,00	40
Steel, Hardened**	P28-A63	0,30	12	—	—	—
Steel, Very Hard***	P28-NM55	1,00	40	—	—	—
Fine finishing: previously honed holes						
Aluminum	P28-J95	0,30	12	P28-DM05	0,83	33
Brass, Soft	P28-J83	0,40	16	P28-J83	0,40	16
Bronze	P28-J95	0,30	12	P28-J95	0,30	12
Carbide	P28-DM05	0,08	3	P28-DM05	0,08	3
Cast Iron	P28-J95	0,13	5	P28-DM05	0,50	20
Ceramic	P28-DM05	0,38	15	P28-DM05	0,38	15
Glass	P28-DM05	0,38	15	P28-DM05	0,38	15
Steel, Soft	P28-J85	0,10	4	P28-NM05	0,40	16
Steel, Hardened	P28-J93	0,13	5	P28-NM05	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.
*** 3rd choice. Use if A63 does not cut.

Replacement Parts for P28 Honing Units (Both Open and Blind Hole)

Mandrel Range*	Wedge\$ Open Hole	Wedge\$ Blind Hole	Retainer Block	Tension Block	Guide Shoe Shims (set of 4)
G-P28-1000VA — G-P28-1187VB	_G-P28	_G-R28	LN-1329A	LN-1336A	LN-1144
G-P28-1250WB — G-P28-1750WE	_G-P28	_G-R28	LN-1329A	LN-1336A	LN-1156
H-P28-1875WE — H-P28-2500WG	H-P28	_H-R28	LN-1330A	LN-1337A	LN-1156
J-P28-2625SC — J-P28-3750SD	_J-P28	_J-R28	LN-1329A	LN-1336A	LN-1156
K-P28-2625SC — K-P28-3750SD	K-P28-1	_K-R28-1	LN-1329A	LN-1336A	LN-1156
K-P28-3875SD — K-P28-5000SD	K-P28-2	_K-R28-2	LN-1329A	LN-1336A	LN-1156
K-P28-5125SD — K-P28-5875SD	_K-P28-3	_K-R28-3	LN-1329A	LN-1336A	LN-1156

\$ Insert 2,3,4 or 5 depending on stone number. Ex. 4G-P28 Wedge for 4-Stone Mandrel

Automatic Size Control Probes

26mm - 51mm (1"-2")

Setting Fixture required for centering and setting Sensing Units. Order ASC-50 Setting Fixture. (For metric version, specify ASC-50M.)

Sensing Tip Part No.	Diameter Range	
	mm	in
ASC-51	26-32	1 - 1 1/4
ASC-52	32-38	1 1/4 - 1 1/2
ASC-53	38-45	1 1/2 - 1 3/4
ASC-54	45-51	1 3/4 - 2

For use on machines with Automatic Size Control units. Select the appropriate size control probe based on workpiece finish diameter. See page 8.4 for complete list of A.S.C. probes.

+ Special Order - Contact Customer Service

Blind Hole R28 Honing Stones

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

†For best results, use with bronze guide shoes.

- * 1st choice
- ** 2nd choice. Use if A55 does not cut.
- *** 3rd choice. Use if A63 does not cut.



Available Stones

		Grit Size												
		70	80	100	150	220	280	320	400	500	600	900	1200	
Hard-----Soft	Aluminum Oxide Stones (A) - 12 per box													
				R28-A43 R28-A45 R28-A4501A	R28-A55 R28-A56 R28-A57 R28-A4701A	R28-A63 R28-A65	R28-A73 R28-A75							
				R28-A49 R28-A4901A RL28-A411 R28-A413	R28-A59 R28-A5901A	R28-A67 R28-A69	R28-A77	R28-A7701A	R28-A8701A					
	Silicon Carbide Stones (J,C) - 12 per box													
				R28-J45	R28-J55	R28-J63 R28-J65 R28-J6501A		R28-J83 R28-J85 R28-J8501A	R28-J93 R28-J95 R28-J9501A	R28-C05†				
		R28-J27		R28-J47	R28-J57 R28-J5701A	R28-J67 R28-J6701A		R28-J87 R28-J8701A	R28-J97					
				R28-J49	R28-J59	R28-J69		R28-J89	R28-J99					
Hard-----Soft	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box													
					R28-DM55			R28-DM85		R28-DM05				
					R28-DV57			R28-DV87		R28-DV07				
					R28-NR53 R28-NMG57			R28-NR83						
					R28-NM55 R28-NM57									
				</										

Recommended Stones for Blind Hole R28 Honing Units

Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _a Surface Finish µm	Approx. R _a Surface Finish µin	Stone to use	Approx. R _a Surface Finish µm	Approx. R _a Surface Finish µin
Deburring: rough holes, all materials						
	R28-A413	—	—	R28-A413	—	—
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	R28-J57	1,38	55	R28-DM85	1,25	50
Brass, Soft	R28-J63	0,83	33	R28-J63	0,83	33
Bronze	R28-J57	1,38	55	R28-J57	1,38	55
Carbide	R28-DM55	0,50	20	R28-DM55	0,50	20
Cast Iron	R28-J57	0,50	20	R28-DM55	2,00	80
Ceramic	R28-DM55	1,00	40	R28-DM55	1,00	40
Glass	R28-DM55	1,75	70	R28-DM55	1,75	70
Steel, Soft	R28-A57	0,75	30	R28-NM55	1,25	50
Steel, Hardened*	R28-A55	0,30	12	R28-NM55	1,00	40
Steel, Hardened**	R28-A63	0,30	12	—	—	—
Steel, Very Hard***	R28-NM55	1,00	40	—	—	—
Fine finishing: previously honed holes						
Aluminum	R28-J95	0,30	12	R28-DM05	0,83	33
Brass, Soft	R28-J83	0,40	16	R28-J83	0,40	16
Bronze	R28-J95	0,30	12	R28-J95	0,30	12
Carbide	R28-DM05	0,08	3	R28-DM05	0,08	3
Cast Iron	R28-J95	0,13	5	R28-DM05	0,50	5
Ceramic	R28-DM05	0,38	15	R28-DM05	0,38	15
Glass	R28-DM05	0,38	15	R28-DM05	0,38	15
Steel, Soft	R28-J95	0,10	4	R28-NM05	0,40	16
Steel, Hardened	R28-J83	0,13	5	R28-NM05	0,18	7

PHT Plateau Hone Tools

Sunnen's PHT tools are used as a final finishing step, after initial honing, to provide a plateau surface on cylinder walls. Made from special abrasive impregnated filament, these long-lasting honing tools are available for portable and CV/CK hone heads. For additional information contact your local Sunnen Field Engineer or call Customer Service toll-free in St. Louis.

Abrasive Set for all P28 Style Mandrels.

Diameter Range		Abrasive Set (320 Grit)
mm	in	
25,146-152,4	.990-6.00	P28-PHT 731

Alignment Bushings

For machines with fully adjustable spindle nose.

Part Number	Bore Size mm	Bore Size inches
C-1000	25,40	1.000
C-1062	26,97	1.0625
C-1125	28,58	1.125
C-1187	30,15	1.1875
C-1250	31,75	1.250

For bores whose finish size falls between the diameters listed in the table, select the bushing whose bore diameter is just *under* finish size. When setting up the job for the first time, the undersize alignment bushing can be honed out to finish size with the same tooling used for honing the workpiece. For bushing diameters outside the standard range call your Sunnen representative.

Hard-tipped Stones

Silicon Carbide (J)	Aluminum Oxide (A)
R28-J57-01A	R28-A47-01A
R28-J85-01A	R28-A49-01A
R28-J87-01A	R28-A55-01A
R28-J95-01A	R28-A57-01A
—	—
—	R28-A59-01A
—	R28-A87-01A

For honing blind hole bores available from stock (12 per box).

Additional Guide Shoes

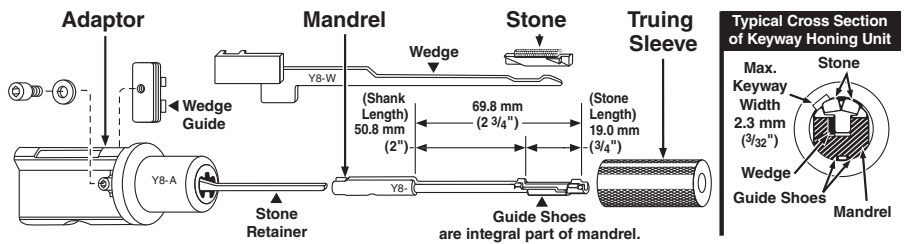
Carbide Inserted	Metal Bond Superabrasive (Specify type of abrasive: Diamond or Borazon/CBN; Grit size and hardness)	
VA-B-TX+	VA-B-	JS2X+
VB-B-TX+	VB-B-	JS2X+
WB-D-TX+	WB-D-	HW8X+
WC-D-TX+	WC-D-	HW8X+
WD-D-TX+	WD-D-	HW8X+
WE-D-TX+	WE-D-	HW8X+
WF-D-TX+	WF-D-	HW8X+
WG-D-TX+	WG-D-	HW8X+
SC-B-TX+	SC-B-	LJ7X†
SD-B-TX+	SD-B-	LJ7X†

†Order 2 shoes per number of stones used.

Y8

Keyway Honing Units

Diameter Range:
6,22 mm – 7,82 mm
.245" – .308"



Order 1-5 For Complete Y8 Keyway Honing Units

Diameter Range 6,22 mm - 7,82 mm .245" - .308"		1 Y8 Mandrel Includes wedge			2 Truing Sleeve		3 Adapter		4 Alignment Bushing		5 Honing Stone	
mm	inches	With Standard Shank Choose One Suffix					With stone retainer and wedge guide		For machines with fully adjustable spindle nose			
6,22-6,35	.245-.250	Y8-245B	S	H	B+	S-245	Y8-A		C-245		See All Stone Tables At Right	
6,35-6,48	.250-.255	Y8-250B	S	H	B+	S-250	Y8-A		C-250			
6,48-6,60	.255-.260	Y8-255B	S	H	B+	S-255	Y8-A		C-255			
6,60-6,73	.260-.265	Y8-260B	S	H	B+	S-260	Y8-A		C-260			
6,73-6,86	.265-.270	Y8-265B	S	H	B+	S-265	Y8-A		C-265			
6,86-6,98	.270-.275	Y8-270B	S	H	B+	S-270	Y8-A		C-270			
6,98-7,11	.275-.280	Y8-275B	S	H	B+	S-275	Y8-A		C-275			
7,11-7,24	.280-.285	Y8-280B	S	H	B+	S-280	Y8-A		C-280			
7,24-7,37	.285-.290	Y8-285B	S	H	B+	S-285	Y8-A		C-285			
7,37-7,49	.290-.295	Y8-290B	S	H	B+	S-290	Y8-A		C-290			
7,49-7,62	.295-.300	Y8-295B	S	H	B+	S-295	Y8-A		C-295			
7,62-7,82	.300-.308	Y8-300B	S	H	B+	S-300	Y8-A		C-300			

Y8 Mandrel Replacement Parts

Y8-W Wedge Replace when wear **begins** to show
LN-3117A Stone Retainer
LN-3211A Wedge Guide

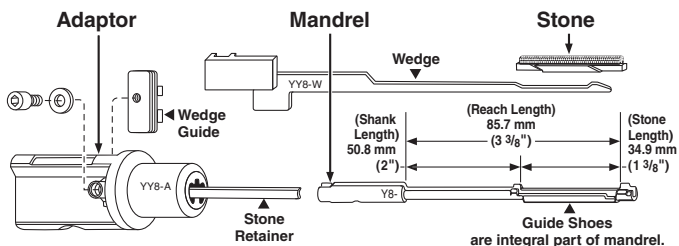
Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel with hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for very fine finishes and honing exotic metals.
+ = **Special Order. Contact Customer Service.**

YY8

Keyway Honing Units

Diameter Range:
6,22 mm – 7,82 mm
.245" – .308"



Order 1-5 For Complete YY8 Keyway Honing Units

Diameter Range 6,22 mm - 7,82 mm .245" - .308"		1 YY8 Mandrel+ Includes wedge			2 Truing Sleeve		3 Adapter		4 Alignment Bushing		5 Honing Stone	
mm	inches	With Standard Shank Choose One Suffix					With stone retainer and wedge guide		For machines with fully adjustable spindle nose			
6,22-6,35	.245-.250	YY8-245B	S+	H+	S-245		Y8-A		C-245		See All Stone Tables At Right	
6,35-6,48	.250-.255	YY8-250B	S+	H+	S-250		Y8-A		C-250			
6,48-6,60	.255-.260	YY8-255B	S+	H+	S-255		Y8-A		C-255			
6,60-6,73	.260-.265	YY8-260B	S+	H+	S-260		Y8-A		C-260			
6,73-6,86	.265-.270	YY8-265B	S+	H+	S-265		Y8-A		C-265			
6,86-6,98	.270-.275	YY8-270B	S+	H+	S-270		Y8-A		C-270			
6,98-7,11	.275-.280	YY8-275B	S+	H+	S-275		Y8-A		C-275			
7,11-7,24	.280-.285	YY8-280B	S+	H+	S-280		Y8-A		C-280			
7,24-7,37	.285-.290	YY8-285B	S+	H+	S-285		Y8-A		C-285			
7,37-7,49	.290-.295	YY8-290B	S+	H+	S-290		Y8-A		C-290			
7,49-7,62	.295-.300	YY8-295B	S+	H+	S-295		Y8-A		C-295			
7,62-7,82	.300-.308	YY8-300B	S+	H+	S-300		Y8-A		C-300			

YY8 Mandrel Replacement Parts

YY8-W Wedge Replace when wear **begins** to show

LN-3117A Stone Retainer
LN-3211A Wedge Guide

NOTES: Standard Keyway Mandrels not suitable for blind holes. Blind Hole Keyway Mandrels and Stones are available on special order basis. Contact Customer Service for price and availability.

These honing units are designed to be used for honing bores with keyways, splines, ports and other surface interruptions.

Keyway Mandrels **must** be trued accurately to keep the honing stone from hanging up in the keyway. Size Truing Sleeve to a diameter between the desired finish bore size and .127 mm (.005") under.

YY8 Mandrels are similar to Y8 Mandrels except stone length is 34,9 mm (1 3/8"). Use only when bore length or interruptions will not allow holes to be honed properly with standard Y8 Mandrels.

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel with hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
+ = Not available in bronze.
+ = **Special Order. Contact Customer Service.**

Y8 & YY8

Keyway Honing Units

Superabrasive Stone Inserted Guide Shoe Mandrels

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Extended Shank Mandrels

Available for honing parts that are too long to be honed with a standard mandrel. Tandem "In-Line" Mandrels Used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

All Available Stones

		Grit Size									
		70	80	100	150	220	280	320	400	500	600 1200
Aluminum Oxide Stones (A) - Y8/12 per box, YY8/6 per box											
Hard--	Soft				Y8-A45 Y8-A47	Y8-A55 Y8-A57	Y8-A65 Y8-A67 Y8-A69				
Hard--	Soft										
Silicon Carbide Stones (J,C) - Y8/12 per box, YY8/6 per box											
Hard--	Soft				Y8-J47	Y8-J57	Y8-J63 Y8-J67	Y8-J83 Y8-J85 Y8-J87	Y8-J93 Y8-J95	Y8-C05	
Hard--	Soft										

Recommended Stones for Y8/YY8 Mandrels

Material	Stone to use	Approx. R _a Surface Finish μm μin
Fast removal: deburred, bored, ground, reamed holes		
Aluminum	Y8/YY8-J57	1,38 55
Brass, Soft	Y8/YY8-J63	0,83 33
Bronze	Y8/YY8-J57	1,38 55
Cast Iron	Y8/YY8-J57	0,50 20
Steel, Soft	Y8/YY8-A57	0,65 25
Steel, Hardened*	Y8/YY8-A55	0,45 18
Steel, Hardened**	Y8/YY8-A63	0,30 12
Fine finishing: previously honed holes		
Aluminum	Y8/YY8-J95	0,30 12
Brass, Soft	Y8/YY8-J83	0,40 16
Bronze	Y8/YY8-J95	0,30 12
Cast Iron	Y8/YY8-J95	0,13 5
Steel, Soft	Y8/YY8-J95	0,10 4
Steel, Hardened	Y8/YY8-J83	0,13 5

* 1st choice
** 2nd choice.
Use if A55 does not cut.



Automatic Size Control Probes

6,10mm -8,20mm (.240"-.323")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter mm in		Diameter Range			
			Low		High	
ASC-0250	6,35	1/4	6,10	.240	6,58	.259
ASC-0266	6,75	17/64	6,50	.256	6,99	.275
ASC-0281	7	9/32	6,83	.269	7,32	.288
ASC-0297	7,54	19/64	7,29	.287	7,77	.306
ASC-0312	8	5/16	7,72	.304	8,20	.323

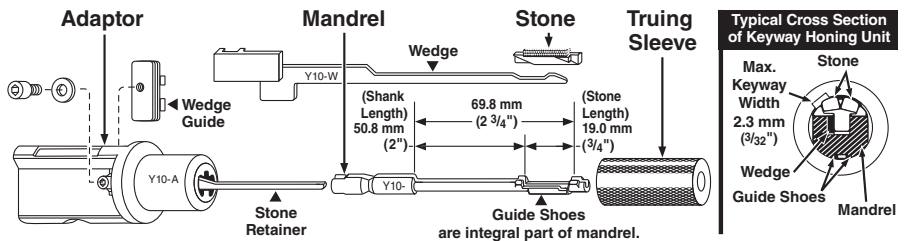
For production honing recommendations using superabrasive stones with Keyway Mandrels contact Customer Service.

* Special Order - Contact Customer Service

Y10

Keyway Honing Units

Diameter Range:
7,82 mm – 9,40 mm
.308" – .370"



Order 1-5 For Complete Y10 Keyway Honing Units

Diameter Range 7,82 mm - 9,40 mm .308" - .370"		1 Y10 Mandrel Includes wedge With Standard Shank	2 Truing Sleeve	3 Adapter	4 Alignment Bushing	5 Honing Stone
mm	inches	Choose One Suffix		With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
7,82-8,03	.308-.316	Y10-308B S H B+	S-308	Y10-A	C-308	See All Stone Tables At Right
8,03-8,20	.316-.323	Y10-316B S H B+	S-316	Y10-A	C-316	
8,20-8,41	.323-.331	Y10-323B S H B+	S-323	Y10-A	C-323	
8,41-8,61	.331-.339	Y10-331B S H B+	S-331	Y10-A	C-331	
8,61-8,81	.339-.347	Y10-339B S H B+	S-339	Y10-A	C-339	
8,81-8,99	.347-.354	Y10-347B S H B+	S-347	Y10-A	C-347	
8,99-9,19	.354-.362	Y10-354B S H B+	S-354	Y10-A	C-354	
9,19-9,40	.362-.370	Y10-362B S H B+	S-362	Y10-A	C-362	

Y10 Mandrel Replacement Parts

Y10-W	Wedge Replace when wear <i>begins</i> to show
LN-3117A	Stone Retainer
LN-3211A	Wedge Guide

Mandrel Options

- S** = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel with hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for very fine finishes and honing exotic metals.
+ = *Special Order. Contact Customer Service.*

NOTES: Standard Keyway Mandrels not suitable for blind holes. Blind Hole Keyway Mandrels and Stones are available on special order basis. Contact Customer Service for price and availability.

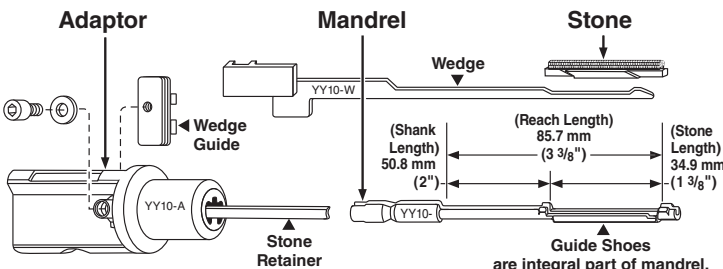
These honing units are designed to be used for honing bores with keyways, splines, ports and other surface interruptions.

Keyway Mandrels *must* be trued accurately to keep the honing stone from hanging up in the keyway. Size Truing Sleeve to a diameter between the desired finish bore size and .127 mm (.005") under.

YY10

Keyway Honing Units

Diameter Range:
7,82 mm – 9,40 mm
.308" – .370"



Order 1-5 For Complete YY10 Keyway Honing Units

Diameter Range 7,82 mm - 9,40 mm .308" - .370"		1 YY10 Mandrel ⁺ Includes wedge With Standard Shank	2 Truing Sleeve	3 Adapter	4 Alignment Bushing	5 Honing Stone
mm	inches	Choose One Suffix		With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
7,82-8,03	.308-.316	YY10-308B S ⁺ H ⁺	S-308	Y10-A	C-308	See All Stone Tables At Right
8,03-8,20	.316-.323	YY10-316B S ⁺ H ⁺	S-316	Y10-A	C-316	
8,20-8,41	.323-.331	YY10-323B S ⁺ H ⁺	S-323	Y10-A	C-323	
8,41-8,61	.331-.339	YY10-331B S ⁺ H ⁺	S-331	Y10-A	C-331	
8,61-8,81	.339-.347	YY10-339B S ⁺ H ⁺	S-339	Y10-A	C-339	
8,81-8,99	.347-.354	YY10-347B S ⁺ H ⁺	S-347	Y10-A	C-347	
8,99-9,19	.354-.362	YY10-354B S ⁺ H ⁺	S-354	Y10-A	C-354	
9,19-9,40	.362-.370	YY10-362B S ⁺ H ⁺	S-362	Y10-A	C-362	

YY10 Mandrel Replacement Parts

YY10-W	Wedge Replace when wear <i>begins</i> to show
LN-3117A	Stone Retainer
LN-3211A	Wedge Guide

Mandrel Options

- S** = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel with hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for very fine finishes and honing exotic metals.
+ = *Special Order. Contact Customer Service.*

YY10 Mandrels are similar to Y10 Mandrels except stone length is 34,9 mm (1 3/8"). Use only when bore length or interruptions will not allow holes to be honed properly with standard Y10 Mandrels.

Y10 & YY10

Keyway Honing Units

Superabrasive Stone Inserted Guide Shoe Mandrels+

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

* 1st choice
** 2nd choice. Use if A55 does not cut.



		All Available Stones									
		Grit Size									
		70	80	100	150	220	280	320	400	500	600 1200
Hard-- --Soft		Aluminum Oxide Stones (A) - Y10/12 per box, YY10/6 per box									
					Y10-A45 Y10-A47	Y10-A55 Y10-A57 Y10-A59	Y10-A65 Y10-A67 Y10-A69				
Hard-- --Soft		Silicon Carbide Stones (J,C) - Y10/12 per box, YY10/6 per box									
						Y10-J57	Y10-J65 Y10-J67			Y10-J95	

Recommended Stones for Y10/YY10 Mandrels			
Material	Stone to use	Approx. R _a Surface Finish	
		µm	µin
Fast removal: deburred, bored, ground, reamed holes			
Aluminum	Y10/YY10-J57	1,38	55
Brass, Soft	Y10/YY10-J63	0,83	33
Bronze	Y10/YY10-J57	1,38	55
Carbide	—	—	—
Cast Iron	Y10/YY10-J57	0,50	20
Ceramic	—	—	—
Glass	—	—	—
Steel, Soft	Y10/YY10-A57	0,65	25
Steel, Hardened*	Y10/YY10-A55	0,45	18
Fine finishing: previously honed holes			
Aluminum	Y10/YY10-J95	0,30	12
Brass, Soft	Y10/YY10-J95	0,40	16
Bronze	Y10/YY10-J95	0,30	12
Carbide	—	—	—
Cast Iron	Y10/YY10-J95	0,13	5
Ceramic	—	—	—
Glass	—	—	—
Steel, Soft	Y10/YY10-J95	0,10	4
Steel, Hardened	Y10/YY10-J95	0,13	5

Automatic Size Control Probes

7,72mm -9,75mm (.304"-.384")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on workpiece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
			Low		High	
	mm	in	mm	in	mm	in
ASC-0312	8	5/16	7,72	.304	8,20	.323
ASC-0328	8,33	21/64	8,08	.318	8,56	.337
ASC-0344	8,73	11/32	8,48	.334	8,97	.353
ASC-0359	9	23/64	8,81	.347	9,30	.366
ASC-0375	9,53	3/8	9,27	.365	9,75	.384

* Special Order - Contact Customer Service

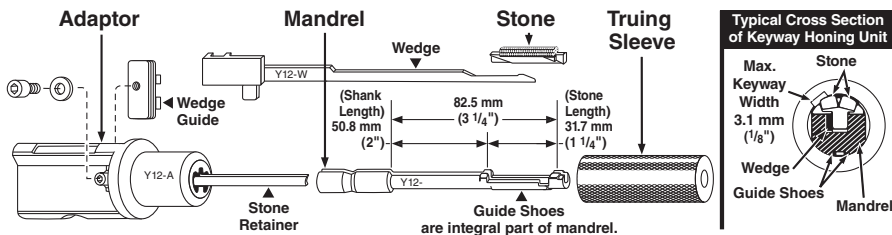
Y12

Keyway Honing Units

Diameter Range:

9,40 mm – 12,57 mm

.370" – .495"



Order 1-5 For Complete Y12 Keyway Honing Units

Diameter Range 9,40 mm - 12,57 mm .370" - .495"		1 Y12 Mandrel*	2 Truing Sleeve	3 Adapter	4 Alignment Bushing	5 Honing Stone
		Includes wedge With Standard Shank		With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
mm	inches	Choose One Suffix				
9,40-9,78	.370-.385	Y12-370B S H B+	S-370	Y12-A	C-370	See All Stone Tables At Right
9,78-10,16	.385-.400	Y12-385B S H B+	S-385	Y12-A	C-385	
10,16-10,57	.400-.416	Y12-400B S H B+	S-400	Y12-A	C-400	
10,57-10,97	.416-.432	Y12-416B S H B+	S-416	Y12-A	C-416	
10,97-11,35	.432-.447	Y12-432B S H B+	S-432	Y12-A	C-432	
11,35-11,76	.447-.463	Y12-447B S H B+	S-447	Y12-A	C-447	
11,76-12,17	.463-.479	Y12-463B S H B+	S-463	Y12-A	C-463	
12,17-12,57	.479-.495	Y12-479B S H B+	S-479	Y12-A	C-479	

Y12 Mandrel Replacement Parts

Y12-W	Wedge Replace when wear <i>begins</i> to show
LN-3167A	Stone Retainer
LN-3214A	Wedge Guide

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel with hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for very fine finishes and honing exotic metals.
+ = Special Order. Contact Customer Service.

NOTES: Standard Keyway Mandrels not suitable for blind holes. Blind Hole Keyway Mandrels and Stones are available on special order basis. Contact Customer Service for price and availability.

These honing units are designed to be used for honing bores with keyways, splines, ports and other surface interruptions.

Keyway Mandrels *must* be trued accurately to keep the honing stone from hanging up in the keyway. Size Truing Sleeve to a diameter between the desired finish bore size and .127 mm (.005") under.

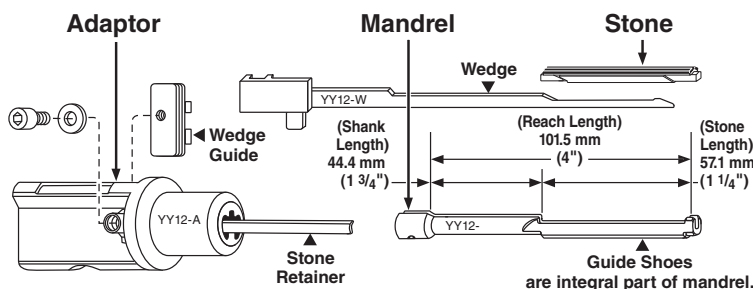
YY12

Keyway Honing Units

Diameter Range:

9,40 mm – 12,57 mm

.370" – .495"



Order 1-5 For Complete YY12 Keyway Honing Units

Diameter Range 9,40 mm - 12,57 mm .370" - .495"		1 YY12 Mandrel†	2 Truing Sleeve	3 Adapter	4 Alignment Bushing	5 Honing Stone
		Includes wedge With Standard Shank		With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
mm	inches	Choose One Suffix				
9,40-9,78	.370-.385	YY12-370B S+ H+	S-370	Y12-A	C-370	See All Stone Tables At Right
9,78-10,16	.385-.400	YY12-385B S+ H+	S-385	Y12-A	C-385	
10,16-10,57	.400-.416	YY12-400B S+ H+	S-400	Y12-A	C-400	
10,57-10,97	.416-.432	YY12-416B S+ H+	S-416	Y12-A	C-416	
10,97-11,35	.432-.447	YY12-432B S+ H+	S-432	Y12-A	C-432	
11,35-11,76	.447-.463	YY12-447B S+ H+	S-447	Y12-A	C-447	
11,76-12,17	.463-.479	YY12-463B S+ H+	S-463	Y12-A	C-463	
12,17-12,57	.479-.495	YY12-479B S+ H+	S-479	Y12-A	C-479	

YY12 Mandrel Replacement Parts

YY12-W	Wedge Replace when wear <i>begins</i> to show
LN-3167A	Stone Retainer
LN-3214A	Wedge Guide

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel with hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
+ = Not available in bronze.
+ = Special Order. Contact Customer Service.

YY12 Mandrels are similar to Y12 Mandrels except stone length is 57,1 mm (2 1/4"). Use only when bore length or interruptions will not allow holes to be honed properly with standard Y12 Mandrels.

Y12 & YY12

Keyway Honing Units

Superabrasive Stone Inserted Guide Shoe Mandrels+

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

CBN and Diamond Stones for Keyway Mandrels+

These Stones consist of a single stone mounted centrally in a metal holder.

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

* 1st choice
** 2nd choice. Use if A55 does not cut.



All Available Stones

	Grit Size										
	70	80	100	150	220	280	320	400	500	600	1200
Hard-- --Soft	Aluminum Oxide Stones (A) - Y12/12 per box, YY12/6 per box										
				Y12-A45 Y12-A47 Y12-A49	Y12-A55 Y12-A57	Y12-A65 Y12-A67 Y12-A69					
Hard-- --Soft	Silicon Carbide Stones (J,C) - Y12/12 per box, YY12/6 per box										
					Y12-J57	Y12-J63 Y12-J65 Y12-J67		Y12-J83 Y12-J85 Y12-J87	Y12-J95		

Recommended Stones for Y12/YY12 Mandrels

Material	Stone to use	Low-Volume	
		Approx. R _a Surface Finish µm	µin
Fast removal: deburred, bored, ground, reamed holes			
Aluminum	Y12/YY12-J57	1,38	55
Brass, Soft	Y12/YY12-J63	0,83	33
Bronze	Y12/YY12-J57	1,38	55
Carbide	—	—	—
Cast Iron	Y12/YY12-J57	0,50	20
Ceramic	—	—	—
Glass	—	—	—
Steel, Soft	Y12/YY12-A57	0,65	25
Steel, Hardened*	Y12/YY12-A55	0,45	18
Fine finishing: previously honed holes			
Aluminum	Y12/YY12-J95	0,30	12
Brass, Soft	Y12/YY12-J83	0,40	16
Bronze	Y12/YY12-J95	0,30	12
Carbide	—	—	—
Cast Iron	Y12/YY12-J95	0,13	5
Ceramic	—	—	—
Glass	—	—	—
Steel, Soft	Y12/YY12-J95	0,10	4
Steel, Hardened	Y12/YY12-J83	0,13	5

9,27mm -12,52mm (.365"-.509")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on workpiece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low		High	
ASC-0375	9,53	3/8	9,27	.365	9,75	.384
ASC-0391	10	25/64	9,73	.383	10,21	.402
ASC-0406	10,32	13/32	10,06	.396	10,54	.415
ASC-0422	10,72	27/64	10,47	.412	10,95	.431
ASC-0438	11	7/16	10,82	.426	11,30	.445
ASC-0453	11,51	29/64	11,25	.443	11,74	.462
ASC-0469	12	15/32	11,71	.461	12,19	.480
ASC-0484	12,3	31/64	12,04	.474	12,52	.493
ASC-0500	12,7	1/2	12,45	.490	12,93	.509

* Special Order - Contact Customer Service

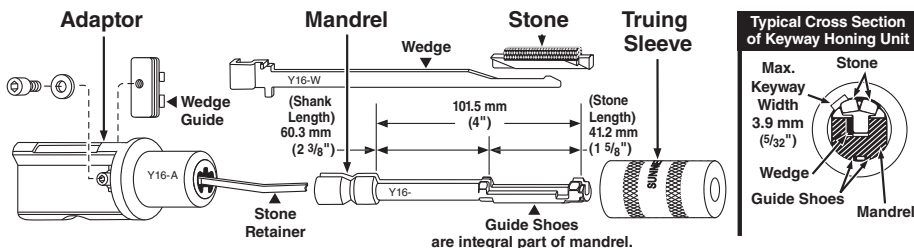
Y16

Keyway Honing Units

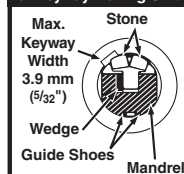
Diameter Range:

12,57 mm – 15,72 mm

.495" – .619"



Typical Cross Section of Keyway Honing Unit



Order 1-5 For Complete Y16 Keyway Honing Units

Diameter Range 12,57 mm - 15,72 mm .495" - .619"		1 Y16 Mandrel	2 Truing Sleeve	3 Adapter	4 Alignment Bushing	5 Honing Stone
		Includes wedge With Standard Shank		With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
mm	inches	Choose One Suffix				
12,57-13,36	.495-.526	Y16-495B	S	H	B*	S-495
13,36-14,15	.526-.557	Y16-526B	S	H	B*	S-526
14,15-14,94	.557-.588	Y16-557B	S	H	B*	S-557
14,94-15,72	.588-.619	Y16-588B	S	H	B*	S-588
				Y16-A	C-495	
				Y16-A	C-526	
				Y16-A	C-557	
				Y16-A	C-588	
						See All Stone Tables At Right

Y16 Mandrel Replacement Parts

Y16-W	Wedge Replace when wear <i>begins</i> to show
LN-3686A	Stone Retainer
LN-3217A	Wedge Guide

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel with hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for very fine finishes and honing exotic metals.
+ = Special Order. Contact Customer Service.

NOTES: Standard Keyway Mandrels not suitable for blind holes. Blind Hole Keyway Mandrels and Stones are available on special order basis. Contact Customer Service for price and availability.

These honing units are designed to be used for honing bores with keyways, splines, ports and other surface interruptions.

Keyway Mandrels *must* be trued accurately to keep the honing stone from hanging up in the keyway. Size Truing Sleeve to a diameter between the desired finish bore size and .127 mm (.005") under.

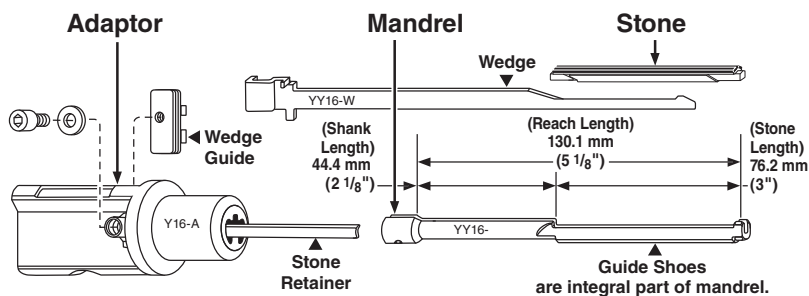
YY16

Keyway Honing Units

Diameter Range:

12,57 mm – 15,72 mm

.495" – .619"



Order 1-5 For Complete YY16 Keyway Honing Units

Diameter Range 12,57 mm - 15,72 mm .495" - .619"		1 YY16 Mandrel†	2 Truing Sleeve	3 Adapter	4 Alignment Bushing	5 Honing Stone
		Includes wedge With Standard Shank		With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
mm	inches	Choose One Suffix				
12,57-13,36	.495-.526	YY16-495B	S*	H*	S-495	
13,36-14,15	.526-.557	YY16-526B	S*	H*	S-526	
14,15-14,94	.557-.588	YY16-557B	S*	H*	S-557	
14,94-15,72	.588-.619	YY16-588B	S*	H*	S-588	
				Y16-A	C-495	
				Y16-A	C-526	
				Y16-A	C-557	
				Y16-A	C-588	
						See All Stone Tables At Right

YY16 Mandrel Replacement Parts

YY16-W	Wedge Replace when wear <i>begins</i> to show
LN-3686A	Stone Retainer
LN-3217A	Wedge Guide

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel with hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
† = Not available in bronze.
+ = Special Order. Contact Customer Service.

YY16 Mandrels are similar to Y16 Mandrels except stone length is 76.2 mm (3"). Use only when bore length or interruptions will not allow holes to be honed properly with standard Y16 Mandrels.

Y16 & YY16

Keyway Honing Units

Superabrasive Stone Inserted Guide Shoe Mandrels⁺

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

Extended Shank Mandrels⁺

Available for honing parts that are too long to be honed with a standard mandrel.

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Tandem "In-Line" Mandrels⁺

Used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

CBN and Diamond Stones for Keyway Mandrels⁺

These Stones consist of a single stone mounted centrally in a metal holder.

		All Available Stones										
		Grit Size										
		70	80	100	150	220	280	320	400	500	600	1200
Hard-- --Soft		Aluminum Oxide Stones (A) - Y16/12 per box, YY16/1 per box										
					Y16-A45	Y16-A55	Y16-A63					
					Y16-A49	Y16-A57	Y16-A65					
Hard-- --Soft		Silicon Carbide Stones (J,C) - Y16/12 per box, YY16/1 per box										
						Y16-J55	Y16-J63		Y16-J83			
						Y16-J57	Y16-J65		Y16-J85	Y16-J95		
Hard-- --Soft		Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box										
						Y16-NM55			Y16-NM85			
						Y16-NM57						

Recommended Stones for Y16/YY16 Mandrels

Material	Low-Volume		High-Volume	
	Stone to use	Approx. R _a Surface Finish µm µin	Stone to use	Approx. R _a Surface Finish µm µin
Fast removal: deburred, bored, ground, reamed holes				
Aluminum	Y16-YY16-J57	1,38 55	—	1,25 50
Brass, Soft	Y16-YY16-J63	0,83 33	Y16/YY16-J63	0,83 33
Bronze	Y16-YY16-J57	1,38 55	Y16/YY16-J57	1,38 55
Carbide	—	—	—	0,50 20
Cast Iron	Y16-YY16-J57	0,50 20	—	2,00 80
Ceramic	—	—	—	1,00 40
Glass	—	—	—	1,75 70
Steel, Soft	Y16-YY16-A57	0,65 25	—	1,25 50
Steel, Hardened*	Y16-YY16-A55	0,45 18	—	1,00 40
Steel, Hardened**	Y16-YY16-A63	0,30 12	—	—
Fine finishing: previously honed holes				
Aluminum	Y16-YY16-J95	0,30 12	—	0,83 33
Brass, Soft	Y16-YY16-J83	0,40 16	Y16/YY16-J83	0,40 16
Bronze	Y16-YY16-J95	0,30 12	Y16/YY16-J95	0,30 12
Carbide	—	—	—	0,08 3
Cast Iron	Y16-YY16-J95	0,13 5	—	0,13 5
Ceramic	—	—	—	0,38 15
Glass	—	—	—	0,38 15
Steel, Soft	Y16-YY16-J95	0,10 4	—	0,40 16
Steel, Hardened	Y16-YY16-J83	0,13 5	—	0,18 7

* 1st choice
** 2nd choice. Use if A55 does not cut.



Automatic Size Control Probes

12,45mm -16,10mm (.490"-.634")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

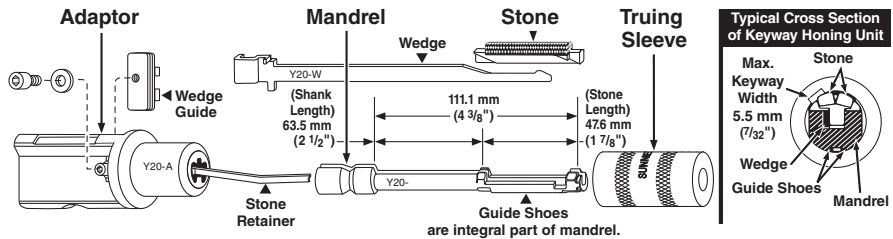
Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	Low in	High mm	High in
ASC-0500	12,7	1/2	12,45	.490	12,93	.509
ASC-0516	13	33/64	12,83	.505	13,31	.524
ASC-0531	13,50	17/32	13,23	.521	13,72	.540
ASC-0547	14	35/64	13,72	.540	14,20	.559
ASC-0562	14,29	9/16	14,02	.552	14,50	.571
ASC-0578	14,68	37/64	14,43	.568	14,91	.587
ASC-0594	15	19/32	14,81	.583	15,29	.602
ASC-0609	15,48	39/64	15,22	.599	15,70	.618
ASC-0625	15,88	5/8	15,62	.615	16,10	.634

* Special Order - Contact Customer Service

Y20

Keyway Honing Units

Diameter Range:
15,72 mm – 19,68 mm
.619" – .775"



Order 1-5 For Complete Y20 Keyway Honing Units

Diameter Range 15,72 mm - 19,68 mm .619" - .775"		1 Y20 Mandrel Includes wedge				2 Truing Sleeve	3 Adapter	4 Alignment Bushing	5 Honing Stone
mm	inches	With Standard Shank Choose One Suffix					With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
15,72-16,51	.619-.650	Y20-619B	S	H	B+	S-619	Y20-A	C-619	See All Stone Tables At Right
16,51-17,30	.650-.681	Y20-650B	S	H	B+	S-650	Y20-A	C-650	
17,30-18,11	.681-.713	Y20-681B	S	H	B+	S-681	Y20-A	C-681	
18,11-18,90	.713-.744	Y20-713B	S	H	B+	S-713	Y20-A	C-713	
18,90-19,68	.744-.775	Y20-744B	S	H	B+	S-744	Y20-A	C-750	

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for very fine finishes and honing exotic metals.

Y20 Mandrel Replacement Parts

Y20-W Wedge Replace when wear *begins* to show
LN-3688A Stone Retainer
LN-3218A Wedge Guide

Superabrasive Stone Inserted Guide Shoe Mandrels+

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

CBN and Diamond Stones for Keyway Mandrels+

These Stones consist of a single stone mounted centrally in a metal holder.

NOTES: Standard Keyway Mandrels not suitable for blind holes. Blind Hole Keyway Mandrels and Stones are available on special order basis. Contact Customer Service

These honing units are designed to be used for honing bores with keyways, splines, ports and other surface interruptions.

Keyway Mandrels *must* be trued accurately to keep the honing stone from hanging up in the keyway. Size Truing Sleeve to a diameter between the desired finish bore size and .127 mm (.005") under.

+ Special Order - Contact Customer Service

Y20

Keyway Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

All Available Stones												
		Grit Size										
		70	80	100	150	220	280	320	400	500	600	1200
Hard-----Soft		Aluminum Oxide Stones (A) - 12 per box										
					Y20-A45 Y20-A47 Y20-A49	Y20-A55 Y20-A57	Y20-A63 Y20-A65 Y20-A67					
Hard---Soft		Silicon Carbide Stones (J,C) - 12 per box										
					Y20-J47	Y20-J57	Y20-J63 Y20-J65 Y20-J67		Y20-J83 Y20-J85 Y20-J87	Y20-J95 Y20-J97	Y20-C05†	
Hard-Soft		Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box										
						Y20-NM55 Y20-NM57			Y20-NM85			

Recommended Stones for Y20 Mandrels

Material	Stone to use	Low-Volume		Stone to use	High-Volume	
		Approx. R _a Surface Finish µm	µin		Approx. R _a Surface Finish µm	µin
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	Y20-J57	1,38	55	—	1,25	50
Brass, Soft	Y20-J63	0,83	33	Y20-J63	0,83	33
Bronze	Y20-J57	1,38	55	Y20-J57	1,38	55
Carbide	—	—	—	—	0,50	20
Cast Iron	Y20-J57	0,50	20	—	2,00	80
Ceramic	—	—	—	—	1,00	40
Glass	—	—	—	—	1,75	70
Steel, Soft	Y20-A57	0,65	25	Y20-NM57	1,25	50
Steel, Hardened*	Y20-A55	0,45	18	Y20-NM57	1,00	40
Steel, Hardened**	Y20-A63	0,30	12	—	—	—
Fine finishing: previously honed holes						
Aluminum	Y16-YY16-J95	0,30	12	—	0,83	33
Brass, Soft	Y16-YY16-J83	0,40	16	Y20-J83	0,40	16
Bronze	Y16-YY16-J95	0,30	12	Y20-J95	0,30	12
Carbide	—	—	—	—	0,08	3
Cast Iron	Y16-YY16-J95	0,13	5	—	0,13	5
Ceramic	—	—	—	—	0,38	15
Glass	—	—	—	—	0,38	15
Steel, Soft	Y16-YY16-J95	0,10	4	—	0,40	16
Steel, Hardened	Y16-YY16-J83	0,13	5	—	0,18	7

* 1st choice

** 2nd choice.
Use if A55
does not cut.



Automatic Size Control Probes

15,62mm - 19,69mm (.615"-.775")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on workpiece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

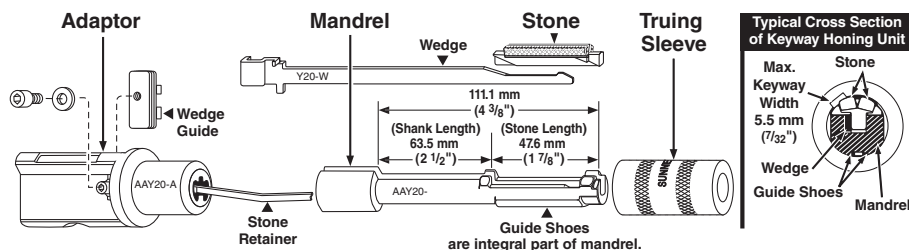
Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low		High	
ASC-0625	15,88	5/8	15,62	.615	16,10	.634
ASC-0630	16	—	15,75	.620	16,23	.639
ASC-0641	16,27	41/64	16,03	.631	16,51	.650
ASC-0656	16,67	21/32	16,41	.646	16,89	.665
ASC-0672	17	43/64	16,79	.661	17,27	.680
ASC-0688	17,46	11/16	17,22	.678	17,70	.697
ASC-0703	18	45/64	17,70	.697	18,19	.716
ASC-0719	18,26	23/32	18,01	.709	18,49	.728
ASC-0734	18,65	47/64	18,39	.724	18,87	.743
ASC-0750	19	3/4	18,80	.740	19,28	.759
ASC-0766	19,45	49/64	19,20	.756	19,69	.775

* Special Order - Contact Customer Service

AAAY20

Keyway Honing Units

Diameter Range:
19,69 mm – 25,25 mm
.775" – .994"



Order 1-5 For Complete AAY20 Keyway Honing Units

Diameter Range 19,69 mm - 25,25 mm .775" - .994"		1 AAY20 Mandrel Includes wedge		2 Truing Sleeve	3 Adapter	4 Alignment Bushing†	5 Honing Stone
mm	inches	With Standard Shank Choose One Suffix			With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
19,68-20,47	.775-.806	AAY20-775B	S H B+	S-775	AAY20-A	C-750	See All Stone Tables At Right
20,47-21,29	.806-.838	AAY20-806B	S H B+	S-806	AAY20-A	C-750/C-812	
21,29-22,07	.838-.869	AAY20-838B	S H B+	S-838	AAY20-A	C-812	
22,07-22,86	.869-.900	AAY20-869B	S H B+	S-869	AAY20-A	C-812/C-875	
22,86-23,65	.900-.931	AAY20-900B	S H B+	S-900	AAY20-A	C-875	
23,65-24,43	.931-.962	AAY20-931B	S H B+	S-931	AAY20-A	C-875/C-937	
24,43-25,25	.962-.994	AAY20-962B	S H B+	S-962	AAY20-A	C-937	

NOTES: Standard Keyway Mandrels not suitable for blind holes. Blind Hole Keyway Mandrels and Stones are available on special order basis. Contact Customer Service.

These honing units are designed to be used for honing bores with keyways, splines, ports and other surface interruptions.

Keyway Mandrels *must* be trued accurately to keep the honing stone from hanging up in the keyway. Size Truing Sleeve to a diameter between the desired finish bore size and .127 mm (.005") under.

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
B = Bronze Mandrel for very fine finishes and honing exotic metals.

† Alignment Bushing

Select the bushing whose bore diameter is just *under* finish size. When setting up the job for the first time, the undersize alignment bushing can be honed out to finish size with the same tooling used for honing the workpiece.

AAAY20 Mandrel Replacement Parts

Y20-W Wedge Replace when wear *begins* to show
LN-3688A Stone Retainer
LN-3218A Wedge Guide

Superabrasive Stone Inserted Guide Shoe Mandrels+

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

Extended Shank Mandrels+

Available for honing parts that are too long to be honed with a standard mandrel.

Tandem "In-Line" Mandrels+

Used to size two or more "In-Line" or tandem bores in perfect alignment. Special tandem mandrels can generally be supplied for those applications which have too long a tandem distance for honing with standard or altered mandrels. See page 12.4 for information on how to hone tandem bores.

CBN and Diamond Stones for Keyway Mandrels+

These Stones consist of a single stone mounted centrally in a metal holder.

† Special Order - Contact Customer Service

AA Y20

Keyway Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

All Available Stones												
Grit Size												
	70	80	100	150	220	280	320	400	500	600	1200	
Soft-----Hard	Aluminum Oxide Stones (A) - 12 per box											
				Y20-A45 Y20-A47 Y20-A49 Y20-A411	Y20-A55 Y20-A57 Y20-A59	Y20-A63 Y20-A65 Y20-A67						
Soft----Hard	Silicon Carbide Stones (J,C) - 12 per box											
				Y20-J45 Y20-J47	Y20-J55 Y20-J57	Y20-J63 Y20-J65 Y20-J67		Y20-J83 Y20-J85 Y20-J87	Y20-J95 Y20-J97	Y20-C05†		
Soft-Hard	Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box											
				Y20-NM55 Y20-NM57			Y20-NM85					

†For best results, use with bronze guide shoes.

Recommended Stones for AAY20 Mandrels

Material	Stone to use	Low-Volume		Stone to use	High-Volume	
		Approx. R _a Surface Finish µm	µin		Approx. R _a Surface Finish µm	µin
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	Y20-J57	1,38	55	—	1,25	50
Brass, Soft	Y20-J63	0,83	33	Y20-J63	0,83	33
Bronze	Y20-J57	1,38	55	Y20-J57	1,38	55
Carbide	—	—	—	—	0,50	20
Cast Iron	Y20-J57	0,50	20	—	2,00	80
Ceramic	—	—	—	—	1,00	40
Glass	—	—	—	—	1,75	70
Steel, Soft	Y20-A57	0,65	25	—	1,25	50
Steel, Hardened*	Y20-A55	0,45	18	—	1,00	40
Steel, Hardened**	Y20-A63	0,30	12	—	—	—
Fine finishing: previously honed holes						
Aluminum	Y20-J95	0,30	12	—	0,83	33
Brass, Soft	Y20-J83	0,40	16	Y20-J83	0,40	16
Bronze	Y20-J95	0,30	12	Y20-J95	0,30	12
Carbide	—	—	—	—	0,08	3
Cast Iron	Y20-J95	0,13	5	—	0,13	5
Ceramic	—	—	—	—	0,38	15
Glass	—	—	—	—	0,38	15
Steel, Soft	Y20-J95	0,10	4	—	0,40	16
Steel, Hardened	Y20-J83	0,13	5	—	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.



Automatic Size Control Probes

19,69mm - 25,63mm (.775"-1.010")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

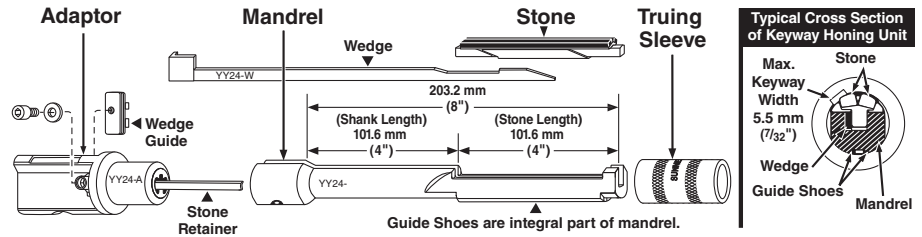
Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	Low in	High mm	High in
ASC-0781	20	25/32	19,69	.775	20,17	.794
ASC-0797	20,24	51/64	19,99	.787	20,47	.806
ASC-0812	20,64	13/16	20,37	.802	20,85	.821
ASC-0828	21	53/64	20,78	.818	21,26	.837
ASC-0844	21,43	27/32	21,18	.834	21,67	.853
ASC-0859	22	55/64	21,67	.853	22,15	.872
ASC-0875	22,22	7/8	21,97	.865	22,45	.884
ASC-0891	22,62	57/64	22,38	.881	22,86	.900
ASC-0906	23	29/32	22,76	.896	23,24	.915
ASC-0922	23,42	59/64	23,17	.912	23,65	.931
ASC-0938	24	15/16	23,67	.932	24,16	.951
ASC-0953	24,21	61/64	23,95	.943	24,44	.962
ASC-0969	24,61	31/32	24,36	.959	24,84	.978
ASC-0984	25	63/64	24,69	.972	25,17	.991
ASC-1000	25,40	1	25,15	.990	25,63	1.010

* Special Order - Contact Customer Service

YY24

Keyway Honing Units

Diameter Range:
15,72 mm – 25,25 mm
.619" – .994"



Order 1-5 For Complete YY24 Keyway Honing Units

Diameter Range 15,72 mm - 25,25 mm .619" - .994"		1 YY24 Mandrel† Includes wedge		2 Truing Sleeve	3 Adapter	4 Alignment Bushing†	5 Honing Stone
mm	inches	With Standard Shank Choose One Suffix		With stone retainer and wedge guide	For machines with fully adjustable spindle nose	See All Stone Tables At Right	
15,72-16,51	.619-.650	YY24-619B__-F16X	S -	S-619	YY24-A	C-619	YY24-__X393
16,51-17,30	.650-.681	YY24-650B__-D56X	S H	S-650	YY24-A	C-650	YY24-__
17,30-18,11	.681-.713	YY24-681B__-D56X	S H	S-681	YY24-A	C-681	YY24-__
18,11-18,90	.713-.744	YY24-713B__-D56X	S H	S-713	YY24-A	C-713	YY24-__
18,90-19,68	.744-.775	YY24-744B	S H	S-744	YY24-A	C-750	YY24-__
19,68-20,47	.775-.806	YY24-775B	S H	S-775	YY24-A	C-750	YY24-__
20,47-21,29	.806-.838	YY24-806B	S H	S-806	YY24-A	C-750/C-812	YY24-__
21,29-22,07	.838-.869	YY24-838B	S H	S-838	YY24-A	C-812/C-875	YY24-__
22,07-22,86	.869-.900	YY24-869B	S H	S-869	YY24-A	C-875	YY24-__
22,86-23,65	.900-.931	YY24-900B	S H	S-900	YY24-A	C-875	YY24-__
23,65-24,43	.931-.962	YY24-931B	S H	S-931	YY24-A	C-875/C-937	YY24-__
24,43-25,25	.962-.994	YY24-962B	S H	S-962	YY24-A	C-937	YY24-__

NOTES: Standard Keyway Mandrels not suitable for blind holes. Blind Hole Keyway Mandrels and Stones are available on special order basis. Contact Customer Service.

These honing units are designed to be used for honing bores with keyways, splines, ports and other surface interruptions.

Keyway Mandrels *must* be trued accurately to keep the honing stone from hanging up in the keyway. Size Truing Sleeve to a diameter between the desired finish bore size and .127 mm (.005") under.

Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
† Not available in bronze.

† Alignment Bushing

Select the bushing whose bore diameter is just *under* finish size. When setting up the job for the first time, the undersize alignment bushing can be honed out to finish size with the same tooling used for honing the workpiece.

Please note that the YY24-__-X393 stones are on non-reusable holders.

YY24 Mandrel Replacement Parts

YY24-W-F16X	Wedge for YY24-619BS-F16X
YY24-W	Wedge for YY24-650B__-D56X thru YY24-962B__ Mandrels
LN-3687A	Stone Retainer
LN-3218A	Wedge Guide

Superabrasive Stone Inserted Guide Shoe Mandrels

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

CBN and Diamond Stones for Keyway Mandrels

Metal Bond
These Stones consist of a single stone mounted centrally in a metal holder.

† Special Order - Contact Customer Service

YY24

Keyway Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

All Available Stones											
			Grit Size								
			70	80	100	150	220	280	320	400	500 600 1200
Hard---Soft			Aluminum Oxide Stones (A) - 1 per box								
						YY24-A45 YY24-A47	YY24-A55 YY24-A57 YY24-A55X393 YY24-A57X393	YY24-A63 YY24-A65 YY24-A67			
Hard---Soft			Silicon Carbide Stones (J,C) - 1 per box								
						YY24-J57	YY24-J63 YY24-J65 YY24-J67 YY24-J65X393	YY24-J83 YY24-J85 YY24-J87 YY24-J83X393	YY24-J95 YY24-J95X393	YY24-J005	
Hard---Soft			Diamond (D) & CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box								
						YY24-NM57		YY24-NM85			

Recommended Stones for YY24 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. Ra µm	Surface Finish µin	Stone to use	Approx. Ra µm	Surface Finish µin
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	YY24-J57	1,38	55	—	1,25	50
Brass, Soft	YY24-J63	0,83	33	YY24-J65	0,83	33
Bronze	YY24-J57	1,38	55	YY24-J57	1,38	55
Carbide	—	—	—	—	0,50	20
Cast Iron	YY24-J57	0,50	20	—	2,00	80
Ceramic	—	—	—	—	1,00	40
Glass	—	—	—	—	1,75	70
Steel, Soft	YY24-A57	0,65	25	—	1,25	50
Steel, Hardened*	YY24-A55	0,45	18	—	1,00	40
Steel, Hardened**	YY24-A63	0,30	12	—	—	—
Fine finishing: previously honed holes						
Aluminum	YY24-J95	0,30	12	—	0,83	33
Brass, Soft	YY24-J83	0,40	16	YY24-J83	0,40	16
Bronze	YY24-J95	0,30	12	YY24-J95	0,30	12
Carbide	—	—	—	—	0,08	3
Cast Iron	YY24-J95	0,13	5	—	0,13	5
Ceramic	—	—	—	—	0,38	15
Glass	—	—	—	—	0,38	15
Steel, Soft	YY24-J95	0,10	4	—	0,40	16
Steel, Hardened	YY24-J83	0,13	5	—	0,18	7

* 1st choice
** 2nd choice.
Use if A55 does not cut.



Automatic Size Control Probes

15,62mm - 25,63mm (.615"-1.010")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

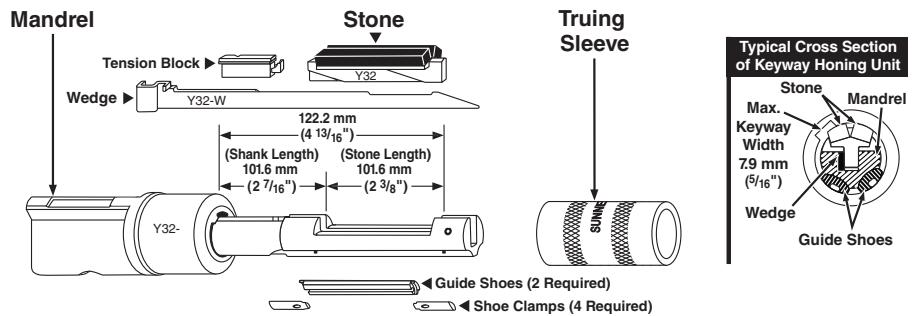
Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	Low in	High mm	High in
ASC-0625	15,88	5/8	15,62	.615	16,10	.634
ASC-0630	16	—	15,75	.620	16,23	.639
ASC-0641	16,27	41/64	16,03	.631	16,51	.650
ASC-0656	16,67	21/32	16,41	.646	16,89	.665
ASC-0672	17	43/64	16,79	.661	17,27	.680
ASC-0688	17,46	11/16	17,22	.678	17,70	.697
ASC-0703	18	45/64	17,70	.697	18,19	.716
ASC-0719	18,26	23/32	18,01	.709	18,49	.728
ASC-0734	18,65	47/64	18,39	.724	18,87	.743
ASC-0750	19	3/4	18,80	.740	19,28	.759
ASC-0766	19,45	49/64	19,20	.756	19,69	.775
ASC-0781	20	25/32	19,69	.775	20,17	.794
ASC-0797	20,24	51/64	19,99	.787	20,47	.806
ASC-0812	20,64	13/16	20,37	.802	20,85	.821
ASC-0828	21	53/64	20,78	.818	21,26	.837
ASC-0844	21,43	27/32	21,18	.834	21,67	.853
ASC-0859	22	55/64	21,67	.853	22,15	.872
ASC-0875	22,22	7/8	21,97	.865	22,45	.884
ASC-0891	22,62	57/64	22,38	.881	22,86	.900
ASC-0906	23	29/32	22,76	.896	23,24	.915
ASC-0922	23,42	59/64	23,17	.912	23,65	.931
ASC-0938	24	15/16	23,67	.932	24,16	.951
ASC-0953	24,21	61/64	23,95	.943	24,44	.962
ASC-0969	24,61	31/32	24,36	.959	24,84	.978
ASC-0984	25	63/64	24,69	.972	25,17	.991
ASC-1000	25,40	1	25,15	.990	25,63	1.010

* Special Order - Contact Customer Service

Y32

Keyway Honing Units

Diameter Range:
25,20 mm – 34,93 mm
.992" – 1.375"



Order 1-4 For Complete Y32 Keyway Honing Units

Diameter Range 25,20 mm - 34,93 mm .992" - 1.375"		1 Y32 Mandrel Supplied with a Y32-A Adapter and Wedge	2 Truing Sleeve	3 Alignment Bushing*	4 Honing Stone	Replacement Guide Shoes 2 required	
mm	inches	With Standard Shank		For machines with fully adjustable spindle nose		Bronze General Purpose Furnished with Mandrel	Hardened Steel For hard, rough parts or carbide, ceramic, etc. Order Separately
25,20-26,97	.992-1.062	Y32-1000PB	S-994	C-1000	See All Stone Tables At Right	PB-B	PB-H
26,77-28,57	1.054-1.125	Y32-1062PB	S-1062	C-1062		PB-B	PB-H
28,37-30,15	1.117-1.187	Y32-1125PB	S-1125	C-1125		PB-B	PB-H
29,95-31,75	1.179-1.250	Y32-1187PC	S-1187	C-1187		PC-B	PC-H
31,55-33,32	1.242-1.312	Y32-1250PC	S-1250	C-1250		PC-B	PC-H
33,12-34,92	1.304-1.375	Y32-1312PC	S-1312	See note below		PC-B	PC-H

NOTES:
Standard Keyway Mandrels not suitable for blind holes. Blind Hole Keyway Mandrels and Stones are available on special order basis. Contact Customer Service.

Alignment Bushing Mandrel Options

Select the bushing whose bore diameter is just *under* finish size. When setting up the job for the first time, the undersize alignment bushing can be honed out to finish size with the same tooling used for honing the workpiece.

Superabrasive Stone Inserted Guide Shoes for situations where a longer life shoe is needed. (See NOTE below)
Contact Customer Service for price and availability.

These honing units are designed to be used for honing bores with keyways, splines, ports and other surface interruptions.

Keyway Mandrels *must* be trued accurately to keep the honing stone from hanging up in the keyway. Size Truing Sleeve to a diameter between the desired finish bore size and .127 mm (.005") under.

Y32 Mandrel Replacement Parts

Y32-W	Wedge Replace when wear <i>begins</i> to show
LN-1617A	Shoe Clamp Set For Mandrels with PB Suffix. 4 clamps with screws
LN-1627A	Shoe Clamp Set For Mandrels with PC Suffix. 4 clamps with screws
LN-1575A	Tension Block
LN-1545A	Set Screw Only (Pkg. of 2)

NOTE:

Superabrasive Stone Inserted Guide Shoe Mandrels*

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

CBN and Diamond Stones for Keyway Mandrels

Metal Bond

These Stones consist of a single stone mounted centrally in a metal holder.

* Special Order - Contact Customer Service

Y32

Keyway Honing Stones

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

		All Available Stones										
		Grit Size										
		70	80	100	150	220	280	320	400	500	600	1200
Har---Soft	Har---Soft	Aluminum Oxide Stones (A) - 2 per box										
					Y32-A45 Y32-A47 Y32-A49	Y32-A55 Y32-A57 Y32-A59	Y32-A63 Y32-A65 Y32-A67					
Hard---Soft	Hard---Soft	Silicon Carbide Stones (J,C) - 2 per box										
					Y32-J45 Y32-J47	Y32-J55 Y32-J57	Y32-J63 Y32-J65 Y32-J67		Y32-J83 Y32-J85 Y32-J87	Y32-J95 Y32-J97		
Hard-Soft	Hard-Soft	Diamond (D) & Borazon/CBN Stones (N) — Metal (M), Resin (R), Vitrified (V) Bond - 1 per box										
						Y32-NM55 Y32-NM57			Y32-NM85			

Recommended Stones for Y32 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _a Surface Finish µm µin		Stone to use	Approx. R _a Surface Finish µm µin	
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	Y32-J57	1,38	55	—	1,25	50
Brass, Soft	Y32-J63	0,83	33	Y32-J63	0,83	33
Bronze	Y32-J57	1,38	55	Y32-J57	1,38	55
Carbide	—	—	—	—	0,50	20
Cast Iron	Y32-J57	0,50	20	—	2,00	80
Ceramic	—	—	—	—	1,00	40
Glass	—	—	—	—	1,75	70
Steel, Soft	Y32-A57	0,65	25	—	1,25	50
Steel, Hardened*	Y32-A55	0,45	18	Y32-NM55	1,00	40
Steel, Hardened**	Y32-A63	0,30	12	Y32-NM55	—	—
Fine finishing: previously honed holes						
Aluminum	Y32-J95	0,30	12	—	0,83	33
Brass, Soft	Y32-J83	0,40	16	Y32-J83	0,40	16
Bronze	Y32-J95	0,30	12	Y32-J95	0,30	12
Carbide	—	—	—	—	0,08	3
Cast Iron	Y32-J95	0,13	5	—	0,13	5
Ceramic	—	—	—	—	0,38	15
Glass	—	—	—	—	0,38	15
Steel, Soft	Y32-J95	0,10	4	—	0,40	16
Steel, Hardened	Y32-J83	0,13	5	—	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.



Automatic Size Control Probes

25,15mm - 38,00mm (.990"-1.500")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	in	High mm	in
ASC-1000	25,40	1	25,15	.990	25,63	1.010
ASC-1016	26	1-1/64	25,68	1.011	26,16	1.030
ASC-51§	—	—	26,00	1.000	32,00	1.250
ASC-52§	—	—	32,00	1.250	38,00	1.500

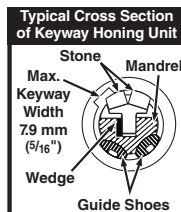
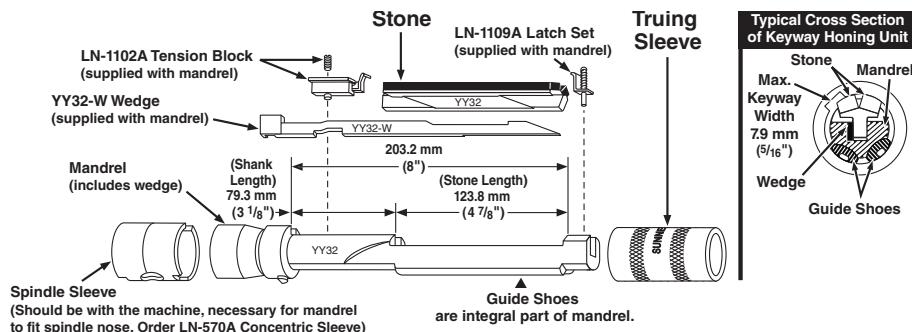
§ Requires the use of ASC-50 setting fixture. Specify ASC-50M for metric applications.

* Special Order - Contact Customer Service

YY32

Keyway Honing Units

Diameter Range:
25,25 mm – 31,50 mm
.994" – 1.240"



Order 1-4 For Complete YY32 Keyway Honing Units

Diameter Range 25,25 mm - 31,50 mm .994" - 1.240"		1 YY32 Mandrel Includes Wedge	2 Truing Sleeve	3 Alignment Bushing†	4 Honing Stone
mm	inches	Steel Mandrel with Standard Shank Choose One Suffix		For machines with fully adjustable spindle nose	See All Stone Tables At Right
25,25-26,04	.994-1.025	YY32-994B	S H	ST-1000	
26,04-26,82	1.025-1.056	YY32-1025B	S H	ST-1000	
26,82-27,64	1.056-1.088	YY32-1056B	S H	ST-1062	
27,64-28,42	1.088-1.119	YY32-1088B	S H	ST-1062	
28,42-29,21	1.119-1.150	YY32-1119B	S H	ST-1125	
29,21-30,00	1.150-1.181	YY32-1150B	S H	ST-1125	
30,00-30,78	1.181-1.212	YY32-1181B	S H	ST-1187	
30,78-31,50	1.212-1.240	YY32-1212B	S H	ST-1187	

NOTES: Standard Keyway Mandrels not suitable for blind holes. Blind Hole Keyway Mandrels and Stones are available on special order basis. Contact Customer Service.

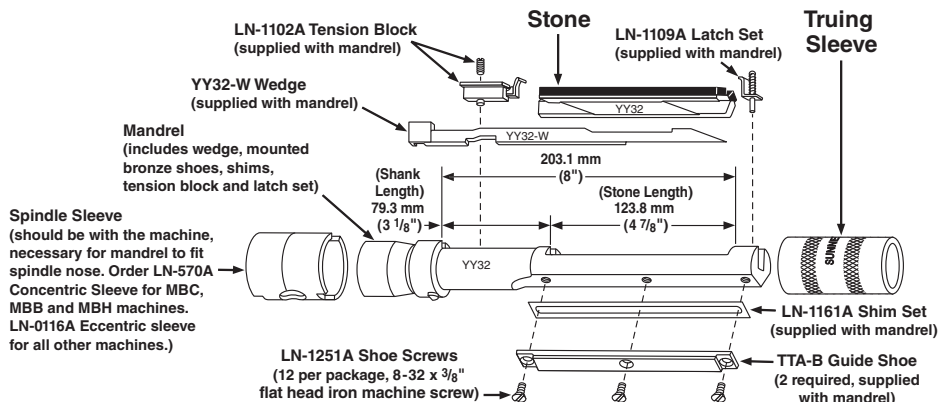
These honing units are designed to be used for honing bores with keyways, splines, ports and other surface interruptions.

Keyway Mandrels *must* be trued accurately to keep the honing stone from hanging up in the keyway. Size Truing Sleeve to a diameter between the desired finish bore size and .127 mm (.005") under.

† Alignment Bushings Mandrel Options

S = Steel Mandrel w/ soft shoes for honing most materials.
H = Steel Mandrel w/ hardened shoes for production honing or hard, rough parts, carbide, ceramic, glass.
Select the bushing whose bore diameter is just *under* finish size. When setting up the job for the first time, the undersize alignment bushing can be honed out to finish size with the same tooling used for honing the workpiece.

Diameter Range:
31,50 mm – 38,10 mm
1.240" – 1.500"



Order 1-5 For Complete YY32 Keyway Honing Units

Diameter Range 31,50 mm - 38,10 mm 1.240" - 1.500"		1 YY32 Mandrel Includes Wedge	2 Truing Sleeve	3 Alignment Bushing†	4 Honing Stone	Replacement Guide Shoes 2 required	
mm	inches	With Standard Shank				Bronze General Purpose Furnished with Mandrel	Hardened Steel For hard, rough parts or carbide, ceramic, etc. Order Separately
31,50-33,33	1.240-1.312	YY32-1250TTA	ST-1187 or ST-1250	C-1187/C-1250	See All Stone Tables At Right	TTA-B	TTA-H
33,07-34,93	1.302-1.375	YY32-1312TTA*	ST-1250 or ST-1300	See note above		TTA-B	TTA-H
34,67-36,50	1.365-1.437	YY32-1375TTA*	ST-1300 or ST-1375	—		TTA-B	TTA-H
36,25-38,10	1.427-1.500	YY32-1437TTA*	ST-1375	—		TTA-B	TTA-H

Truing Sleeve

Select the truing sleeve whose bore diameter is just under finish size.
Hone or bore this sleeve .127 mm (.005") from finish size.

† Alignment Bushings

Select the bushing whose bore diameter is just *under* finish size. When setting up the job for the first time, the undersize alignment bushing can be honed out to finish size with the same tooling used for honing the workpiece.

* Special Order - Contact Customer Service

YY32

Keyway Honing Units

YY32 Mandrel Replacement Parts

YY32-W	Wedge Replace when wear <i>begins</i> to show
LN-1102A	Tension Block
LN-1545A	Set Screw Only (pkg. of 2)
LN-1161A	Shim Set (pkg. of 4)
LN-1251A	Shoe Screws (pkg. of 12)
LN-1109A	Latch Set

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Superabrasive Stone Inserted Guide Shoe Mandrels

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

CBN and Diamond Stones for Keyway Mandrels

Metal Bond

These Stones consist of a single stone mounted centrally in a metal holder.

All Available Stones

		Grit Size										
		70	80	100	150	220	280	320	400	500	600	1200
Hard-----Soft		Aluminum Oxide Stones (A) - 1 per box										
						YY32-A55 YY32-A57	YY32-A67					
Hard---Soft		Silicon Carbide Stones (J,C) - 1 per box										
						YY32-J55 YY32-J57	YY32-J65 YY32-J67		YY32-J85	YY32-J95		

Recommended Stones for YY32 Mandrels

Material	Stone to use	Low-Volume		Stone to use	High-Volume	
		Approx. R _a Surface Finish µm	R _a µin		Approx. R _a Surface Finish µm	R _a µin
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	YY32-J57	1,38	55	—	1,25	50
Brass, Soft	YY32-J63	0,83	33	YY32-J63	0,83	33
Bronze	YY32-J57	1,38	55	YY32-J57	1,38	55
Carbide	—	—	—	—	0,50	20
Cast Iron	YY32-J57	0,50	20	—	2,00	80
Ceramic	—	—	—	—	1,00	40
Glass	—	—	—	—	1,75	70
Steel, Soft	YY32-A57	0,65	25	—	1,25	50
Steel, Hardened*	YY32-A55	0,45	18	—	1,00	40
Steel, Hardened**	YY32-A63	0,30	12	—	—	—
Fine finishing: previously honed holes						
Aluminum	YY32-J95	0,30	12	—	0,83	33
Brass, Soft	YY32-J83	0,40	16	YY32-J83	0,40	16
Bronze	YY32-J95	0,30	12	YY32-J95	0,30	12
Carbide	—	—	—	—	0,08	3
Cast Iron	YY32-J95	0,13	5	—	0,13	5
Ceramic	—	—	—	—	0,38	15
Glass	—	—	—	—	0,38	15
Steel, Soft	YY32-J95	0,10	4	—	0,40	16
Steel, Hardened	YY32-J83	0,13	5	—	0,18	7

* 1st choice
** 2nd choice.
Use if A55 does not cut.



Automatic Size Control Probes

25,15mm - 38,00mm (.990"-1.500")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on work-piece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	in	High mm	in
ASC-1000	25,40	1	25,15	.990	25,63	1.010
ASC-1016	26	1-1/64	25,68	1.011	26,16	1.030
ASC-51§	—	—	26,00	1.000	32,00	1.250
ASC-52§	—	—	32,00	1.250	38,00	1.500

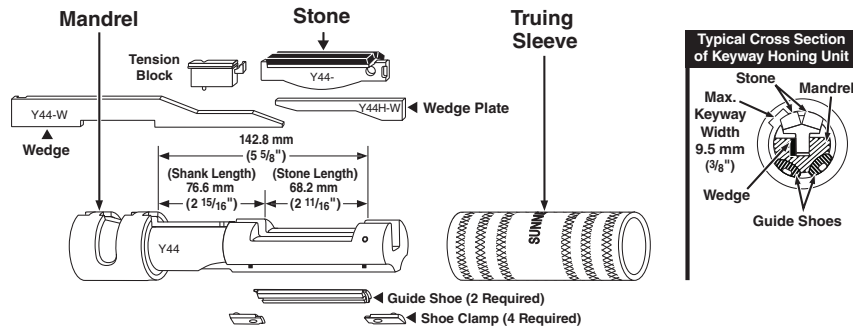
§ Requires the use of ASC-50 setting fixture. Specify ASC-50M for metric applications.

* Special Order - Contact Customer Service

Y44

Keyway Honing Units

Diameter Range:
34,67 mm – 44,45 mm
1.365" – 1.750"



Order 1-3 For Complete Y44 Keyway Honing Units

Diameter Range 34,67 mm - 44,45 mm 1.365" - 1.750"		1 Y44 Mandrel	2 Truing Sleeve	3 Honing Stone	Replacement Guide Shoes ^{2 required}	
mm	inches	With Standard Shank			Bronze General Purpose Furnished with Mandrel	Hardened Steel For hard, rough parts or carbide, ceramic, etc. Order Separately
34,67-38,10	1.365-1.500	Y44-1375PD	ST-1375	See All Stone Tables At Right	PD-B	PD-H
37,85-41,28	1.490-1.625	Y44-1500PD	ST-1500		PD-B	PD-H
41,02-44,45	1.615-1.750	Y44-1625PD	ST-1625		PD-B	PD-H

Truing Sleeve

Select the truing sleeve whose bore diameter is just *under* finish size.
Hone or bore this sleeve .127mm (.005") from finish size.

Superabrasive Stone Inserted Guide Shoes are available where a longer life shoe is needed. Contact Customer Service for ordering information. (See NOTE below)

NOTES: Standard Keyway Mandrels not suitable for blind holes. Blind Hole Keyway Mandrels and Stones are available on special order basis. Contact Customer Service.

These honing units are designed to be used for honing bores with keyways, splines, ports and other surface interruptions.

Keyway Mandrels *must* be trued accurately to keep the honing stone from hanging up in the keyway. Size Truing Sleeve to a diameter between the desired finish bore size and .127 mm (.005") under.

Y44 Mandrel Replacement Parts

Y44-W	Wedge Replace when wear <i>begins</i> to show
Y44L-W	Wedge Plate (Low)
Y44H-W	Wedge Plate (High)
LN-1637A	Shoe Clamp Set 4 clamps with screws
LN-1685A	Tension Block
LN-1545A	Set Screw Only (pkg. of 2)

CBN and Diamond Stones for Keyway Mandrels+ Metal Bond

These Stones consist of a single stone mounted centrally in a metal holder.

NOTE:

Superabrasive Stone Inserted Guide Shoe Mandrels+

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

+ Special Order - Contact Customer Service

Y44

Keyway Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

All Available Stones											
	Grit Size										
	70	80	100	150	220	280	320	400	500	600	1200
Hard----Soft	Aluminum Oxide Stones (A) - 2 per box										
				Y44-A45 Y44-A47 Y44-A49	Y44-A55 Y44-A57	Y44-A63 Y44-A65 Y44-A67					
Hard-Soft	Silicon Carbide Stones (J,C) - 2 per box										
	Y44-J27			Y44-J45 Y44-J47	Y44-J55 Y44-J57	Y44-J63 Y44-J65 Y44-J67		Y44-J83 Y44-J85 Y44-J87	Y44-J95	Y44-C05	

Recommended Stones for Y44 Mandrels						
Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _a Surface Finish µm	µin	Stone to use	Approx. R _a Surface Finish µm	µin
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	Y44-J57	1,38	55	—	1,25	50
Brass, Soft	Y44-J63	0,83	33	—	0,83	33
Bronze	Y44-J57	1,38	55	Y44-J57	1,38	55
Carbide	—	—	—	—	0,50	20
Cast Iron	Y44-J57	0,50	20	—	2,00	80
Ceramic	—	—	—	—	1,00	40
Glass	—	—	—	—	1,75	70
Steel, Soft	Y44-A57	0,65	25	—	1,25	50
Steel, Hardened*	Y44-A55	0,45	18	—	1,00	40
Steel, Hardened**	Y44-A63	0,30	12	—	—	—
Fine finishing: previously honed holes						
Aluminum	Y44-J95	0,30	12	—	0,83	33
Brass, Soft	Y44-J83	0,40	16	Y44-J83	0,40	16
Bronze	Y44-J95	0,30	12	Y44-J95	0,30	12
Carbide	—	—	—	—	0,08	3
Cast Iron	Y44-J95	0,13	5	—	0,13	5
Ceramic	—	—	—	—	0,38	15
Glass	—	—	—	—	0,38	15
Steel, Soft	Y44-J95	0,10	4	—	0,40	16
Steel, Hardened	Y44-J83	0,13	5	—	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.



Automatic Size Control Probes

32mm - 45mm (1.250"-1.750")

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on workpiece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

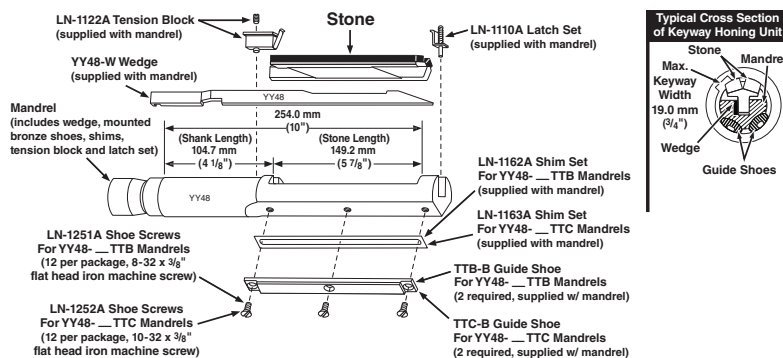
Sensing Tip Part No.	Diameter Range			
	Low mm	in	High mm	in
ASC-52§	32	1.250	38	1.500
ASC-53§	38	1.500	45	1.750

§Requires the use of ASC-50 Setting Fixture. Specify ASC-50M for metric applications.

YY48

Keyway Honing Units

Diameter Range:
37,85 mm – 65,08 mm
1.490" – 2.562"



Order 1-3 For Complete YY48 Keyway Honing Units

Diameter Range 37,85 mm – 65,08 mm 1.490" – 2.562"		1 YY48 Mandrel	2 Truing Sleeve	3 Honing Stone	Replacement Guide Shoes 2 required	
mm	inches	With Standard Shank			Bronze General Purpose Furnished with Mandrel	Hardened Steel For hard, rough parts or carbide, ceramic, etc. Order Separately
37,85-39,67	1.490-1.562	YY48-1500TTB	ST-1500	See All Stone Tables At Right	TTB-B	TTB-B-JQ6X+
39,42-41,28	1.552-1.625	YY48-1562TTB	ST-1500		TTB-B	TTB-B-JQ6X+
41,02-42,85	1.615-1.687	YY48-1625TTB	ST-1600		TTB-B	TTB-B-JQ6X+
42,60-44,45	1.677-1.750	YY48-1687TTB	ST-1600		TTB-B	TTB-B-JQ6X+
44,20-46,02	1.740-1.812	YY48-1750TTB	ST-1700		TTB-B	TTB-B-JQ6X+
45,77-47,63	1.802-1.875	YY48-1812TTB	ST-1700		TTB-B	TTB-B-JQ6X+
47,37-49,20	1.865-1.937	YY48-1875TTB	ST-1875		TTB-B	TTB-B-JQ6X+
48,95-50,80	1.927-2.000	YY48-1937TTB	ST-1875		TTB-B	TTB-B-JQ6X+
50,55-52,37	1.990-2.062	YY48-2000TTC	ST-2000		TTC-B	TTC-B-JQ6X+
52,12-53,98	2.052-2.125	YY48-2062TTC	ST-2000		TTC-B	TTC-B-JQ6X+
53,72-55,55	2.115-2.187	YY48-2125TTC	ST-2100		TTC-B	TTC-B-JQ6X+
55,30-57,15	2.177-2.250	YY48-2187TTC	ST-2100		TTC-B	TTC-B-JQ6X+
56,90-58,72	2.240-2.312	YY48-2250TTC	ST-2200		TTC-B	TTC-B-JQ6X+
58,47-60,33	2.302-2.375	YY48-2312TTC	ST-2200		TTC-B	TTC-B-JQ6X+
60,07-61,90	2.365-2.437	YY48-2375TTC	ST-2375		TTC-B	TTC-B-JQ6X+
61,65-63,50	2.427-2.500	YY48-2437TTC	ST-2375		TTC-B	TTC-B-JQ6X+
63,25-65,07	2.490-2.562	YY48-2500TTC	ST-2500		TTC-B	TTC-B-JQ6X+

Truing Sleeve

Select the truing sleeve whose bore diameter is just under finish size.
Hone or bore this sleeve .127mm (.005") from finish size.
Superabrasive Stone Inserted Guide Shoes are available for situations where a longer life shoe is needed. Contact Customer Service for ordering information.
(See NOTE below)

YY48 Mandrel Replacement Parts Sizes 37,85 - 50,80 (1.490" - 2.000")

YY48-WL Wedge
Replace when wear *begins* to show

LN-1162A Shim Set
LN-1251A Guide Shoe Screws
(12 per package)
LN-1122A Tension Block
LN-1545A Set Screw Only (pkg. of 2)
LN-1110A Latch Set

Sizes 50,55 - 65,07 (1.990" - 2.562")

YY48-WL Wedge
Replace when wear *begins* to show

LN-1163A Shim Set
LN-1252A Guide Shoe Screws
(12 per package)
LN-1122A Tension Block
LN-1545A Set Screw Only (pkg. of 2)
LN-1110A Latch Set

CBN and Diamond Stones for Keyway Mandrels

Metal Bond
These Stones consist of a single stone mounted centrally in a metal holder.

NOTE:

Superabrasive Stone Inserted Guide Shoe Mandrels+

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

+ Special Order - Contact Customer Service

YY48

Keyway Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

		All Available Stones									
		Grit Size									
Hardness		70	80	100	150	220	280	320	400	500	600 1200
		Aluminum Oxide Stones (A) - 1 per box									
Hard	Soft				YY48-A47 YY48-A49	YY48-A55 YY48-A57					
Hardness		Silicon Carbide Stones (J,C) - 1 per box									
					YY48-J45	YY48-J55 YY48-J57	YY48-J65 YY48-J67		YY48-J85 YY48-J87	YY48-J95	YY48-C05

*NOTE: Stone may have to be ground down slightly to fit into small diameter bore.

Recommended Stones for YY48 Mandrels						
Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _a Surface Finish µm	µin	Stone to use	Approx. R _a Surface Finish µm	µin
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	YY48-J57	1,38	55	—	1,25	50
Brass, Soft	YY48-J67	0,83	33	YY48-J67	0,83	33
Bronze	YY48-J57	1,38	55	YY48-J57	1,38	55
Carbide	—	—	—	—	0,50	20
Cast Iron	YY48-J57	0,50	20	—	2,00	80
Ceramic	—	—	—	—	1,00	40
Glass	—	—	—	—	1,75	70
Steel, Soft	YY48-A57	0,65	25	—	1,25	50
Steel, Hardened*	YY48-A55	0,45	18	—	1,00	40
Steel, Hardened**	YY48-A57	0,30	15	—	—	—
Fine finishing: previously honed holes						
Aluminum	YY48-J95	0,30	12	—	0,83	33
Brass, Soft	YY48-J83	0,40	16	YY48-J83	0,40	16
Bronze	YY48-J95	0,30	12	YY48-J95	0,30	12
Carbide	—	—	—	—	0,08	3
Cast Iron	YY48-J95	0,13	5	—	0,13	5
Ceramic	—	—	—	—	0,38	15
Glass	—	—	—	—	0,38	15
Steel, Soft	YY48-J95	0,10	4	—	0,40	16
Steel, Hardened	YY48-J83	0,13	5	—	0,18	7

* 1st choice
** 2nd choice. Use if A55 does not cut.



Automatic Size Control Probes

32mm - 51mm (1.250"-2.0")†

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on workpiece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Diameter Range			
	Low		High	
	mm	in	mm	in
ASC-52†	32	1.250	38	1.500
ASC-53†	38	1.500	45	1.750
ASC-54†	45	1.750	51	2.000

† Automatic size control probes not available above 51 mm (2.0").

‡ Requires the use of ASC-50 Setting Fixture. Specify ASC-50M for metric applications.

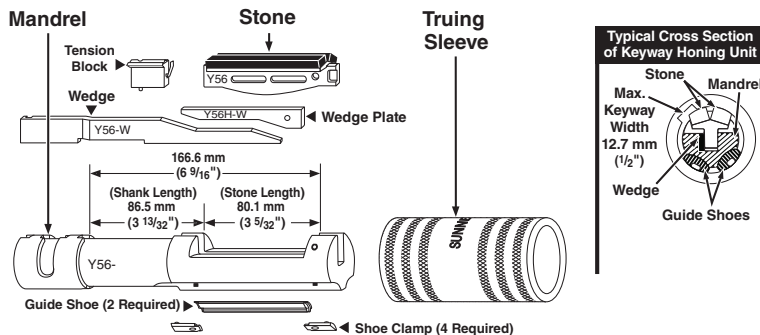
Y56

Keyway Honing Units

Diameter Range:

44,20 mm – 57,15 mm

1.740" – 2.250"



Order 1-3 For Complete Y56 Keyway Honing Units

Diameter Range 44,20 mm - 57,15 mm 1.740" - 2.250"		1 Y56 Mandrel	2 Truing Sleeve	3 Honing Stone	Replacement Guide Shoes ^{2 required}	
mm	inches	With Standard Shank			Bronze General Purpose Furnished with Mandrel	Hardened Steel For hard, rough parts or carbide, ceramic, etc. Order Separately
44,20-47,63	1.740-1.875	Y56-1750PE	ST-1700	See All Stone Tables At Right	PE-B	PE-H
47,37-50,80	1.865-2.000	Y56-1875PE	ST-1875		PE-B	PE-H
50,55-53,98	1.990-2.125	Y56-2000PE	ST-2000		PE-B	PE-H
53,72-57,15	2.115-2.250	Y56-2125PE	ST-2100		PE-B	PE-H

Truing Sleeve

Select the truing sleeve whose bore diameter is just under finish size. Hone or bore this sleeve .127mm (.005") from finish size.

Superabrasive Stone Inserted Guide Shoes are available for situations where a longer life shoe is needed.

Contact Customer Service for price and availability. (See NOTE below)

Y56 Mandrel Replacement Parts

Y56-W	Wedge Replace when wear <i>begins</i> to show
Y56L-W	Wedge Plate (Low)
Y56H-W	Wedge Plate (High) Replace when wear <i>begins</i> to show
LN-1647A	Shoe Clamp Set 4 clamps with screws
LN-1337A	Tension Block
LN-1545A	Set Screw Only (pkg. of 2)

CBN and Diamond Stones for Keyway Mandrels⁺ Metal Bond

These Stones consist of a single stone mounted centrally in a metal holder.

NOTE:

Superabrasive Stone Inserted Guide Shoe Mandrels⁺

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

NOTES: Standard Keyway Mandrels not suitable for blind holes. Blind Hole Keyway Mandrels and Stones are available on special order basis. Contact Customer Service.

These honing units are designed to be used for honing bores with keyways, splines, ports and other surface interruptions.

Keyway Mandrels *must* be trued accurately to keep the honing stone from hanging up in the keyway. Size Truing Sleeve to a diameter between the desired finish bore size and .127 mm (.005") under.

⁺ Special Order - Contact Customer Service

Y56

Keyway Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

All Available Stones												
Grit Size												
70 80 100 150 220 280 320 400 500 600 1200												
Hard-----Soft	Aluminum Oxide Stones (A) - 2 per box											
				Y56-A45	Y56-A55	Y56-A63 Y56-A65						
				Y56-A47	Y56-A57							
				Y56-A49	Y56-A59							
Hard-Soft	Silicon Carbide Stones (J,C) - 2 per box											
				Y56-J45 Y56-J47	Y56-J55 Y56-J57	Y56-J63 Y56-J65 Y56-J67		Y56-J83 Y56-J85 Y56-J87	Y56-J95 Y56-J97	Y56-C05		

Recommended Stones for Y56 Mandrels

Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _a Surface Finish μm μin		Stone to use	Approx. R _a Surface Finish μm μin	
Fast removal: deburred, bored, ground, reamed holes						
Aluminum	Y56-J57	1,38 55		—	1,25 50	
Brass, Soft	Y56-J63	0,83 33		Y56-J63	0,83 33	
Bronze	Y56-J57	1,38 55		Y56-J57	1,38 55	
Carbide	—	—		—	0,50 20	
Cast Iron	Y56-J57	0,50 20		—	1,50 60	
Ceramic	—	—		—	1,00 40	
Glass	—	—		—	1,50 60	
Steel, Soft	Y56-A57	0,65 25		—	1,25 50	
Steel, Hardened*	Y56-A55	0,45 18		—	1,00 40	
Steel, Hardened**	Y56-A63	0,30 12		—	—	
Fine finishing: previously honed holes						
Aluminum	Y56-J95	0,30 12		—	0,83 33	
Brass, Soft	Y56-J83	0,40 16		Y56-J83	0,40 16	
Bronze	Y56-J95	0,30 12		Y56-J95	0,30 12	
Carbide	—	—		—	0,08 3	
Cast Iron	Y56-J95	0,13 5		—	0,13 5	
Ceramic	—	—		—	0,38 15	
Glass	—	—		—	0,38 15	
Steel, Soft	Y56-J95	0,10 4		—	0,40 16	
Steel, Hardened	Y56-J83	0,13 5		—	0,18 7	

* 1st choice
** 2nd choice. Use if A55 does not cut.



Automatic Size Control Probes

38mm - 51mm (1.500"-2.0")†

For use on machines with Automatic Size Control units. Select the appropriate Size Control Probe based on workpiece finish diameter. See page 8.4 for complete list of A.S.C. Sensing Tips.

Sensing Tip Part No.	Diameter Range			
	Low		High	
	mm	in	mm	in
ASC-53‡	38	1.500	45	1.750
ASC-54‡	45	1.750	51	2.000

† Automatic size control probes not available above 51 mm (2.0").

‡ Requires the use of ASC-50 Setting Fixture. Specify ASC-50M for metric applications.

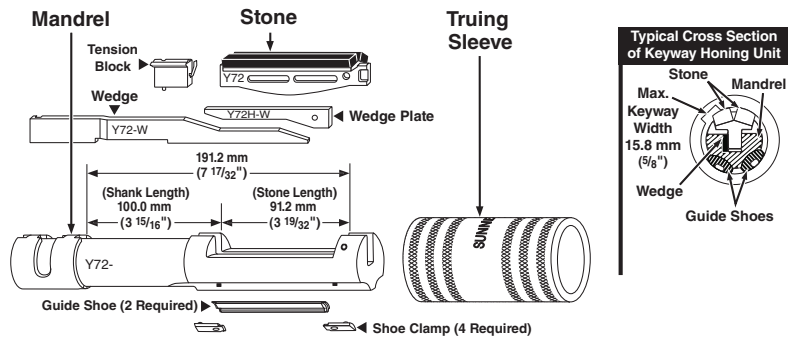
Y72

Keyway Honing Units

Diameter Range:

56,90 mm – 69,85 mm

2.240" – 2.750"



Order 1-3 For Complete Y72 Keyway Honing Units

Diameter Range 56,90 mm - 69,85 mm 2.240" - 2.750"		1 Y72 Mandrel	2 Truing Sleeve	3 Honing Stone	Replacement Guide Shoes 2 required	
mm	inches	With Standard Shank			Bronze General Purpose Furnished with Mandrel	Hardened Steel
56,90-60,32	2.240-2.375	Y72-2250PF	ST-2200	See All Stone Tables At Right	PF-B	PF-H
60,07-63,50	2.365-2.500	Y72-2375PF	ST-2375		PF-B	PF-H
63,25-66,27	2.490-2.625	Y72-2500PF	ST-2500		PF-B	PF-H
66,42-69,85	2.615-2.750	Y72-2625PF	ST-2625		PF-B	PF-H

NOTES: Standard Keyway Mandrels not suitable for blind holes. Blind Hole Keyway Mandrels and Stones are available on special order basis. Contact Customer Service.

These honing units are designed to be used for honing bores with keyways, splines, ports and other surface interruptions.

Keyway Mandrels *must* be trued accurately to keep the honing stone from hanging up in the keyway. Size Truing Sleeve to a diameter between the desired finish bore size and ,127 mm (.005") under.

Truing Sleeve

Select the truing sleeve whose bore diameter is just under finish size. Hone or bore this sleeve ,127mm (.005") from finish size.

Superabrasive Stone Inserted Guide Shoes are available for situations where a longer life shoe is needed.

Contact Customer Service for price and availability. (See NOTE below)

Y72 Mandrel Replacement Parts

Y72-W	Wedge Replace when wear <i>begins</i> to show
Y72L-W	Wedge Plate (Low)
Y72H-W	Wedge Plate (High) Replace when wear <i>begins</i> to show
LN-1657A	Shoe Clamp Set 4 clamps with screws
LN-1337A	Tension Block
LN-1655A	Main Slot Wear Plate Not shown
LN-1545A	Set Screw Only (pkg. of 2)

CBN and Diamond Stones for Keyway Mandrels+ Metal Bond

These Stones consist of a single stone mounted centrally in a metal holder.

NOTE:

Superabrasive Stone Inserted Guide Shoe Mandrels+

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

+ Special Order - Contact Customer Service

Y72

Keyway Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

* 1st choice
** 2nd choice.
Use if A55 does not cut.

All Available Stones										
	Grit Size									
	70	80	100	150	220	280	320	400	500	600 1200
Hard--Soft	Aluminum Oxide Stones (A) - 2 per box									
				Y72-A45 Y72-A47 Y72-A49	Y72-A55 Y72-A57	Y72-A63 Y72-A65				
Hard--Soft	Silicon Carbide Stones (J,C) - 2 per box									
				Y72-J47	Y72-J57	Y72-J65		Y72-J85 Y72-J87	Y72-J95	

Recommended Stones for Y72 Mandrels						
Material	Low-Volume			High-Volume		
	Stone to use	Approx. Ra Surface Finish µm pin		Stone to use	Approx. Ra Surface Finish µm pin	
Deburring: rough holes, all materials						
	Y72-A47	—	—	Y72-A47	—	—
Fast removal: deburred, ground, reamed holes						
Aluminum	Y72-J57	1,38	55	—	—	—
Brass, Soft	Y72-J65	0,83	33	Y72-J63	0,83	33
Bronze	Y72-J57	1,38	55	Y72-J57	1,38	55
Carbide	Y72-DM37	0,50	20	—	—	—
Cast Iron	Y72-J57	1,20	48	—	—	—
Ceramic	—	—	—	—	—	—
Glass	—	—	—	—	—	—
Steel, Soft	Y72-A57	0,65	25	—	—	—
Steel, Hardened*	Y72-A55	0,45	18	—	—	—
Steel, Hardened**	Y72-A63	0,30	12	—	—	—
Fine finishing: previously honed holes						
Aluminum	Y72-J95	0,30	12	—	0,83	33
Brass, Soft	Y72-J85	0,40	16	Y72-J85	0,40	16
Bronze	Y72-J95	0,30	12	Y72-J95	0,30	12
Carbide	Y72-DM05	0,08	3	—	0,08	3
Cast Iron	Y72-J95	0,13	5	—	0,13	5
Ceramic	—	—	—	—	0,38	15
Glass	—	—	—	—	0,38	15
Steel, Soft	Y72-J95	0,10	4	—	0,40	16
Steel, Hardened	Y72-J85	0,13	5	—	0,18	7

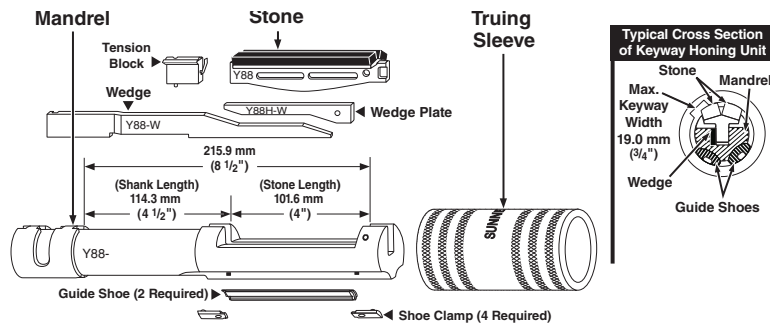
Y88

Keyway Honing Units

Diameter Range:

69,60 mm – 82,55 mm

2.740" – 3.250"



Order 1-3 For Complete Y88 Keyway Honing Units

Diameter Range 69,60 mm - 82,55 mm 2.740" - 3.250"		1 Y88 Mandrel	2 Truing Sleeve	3 Honing Stone	Replacement Guide Shoes ^{2 required}	
mm	inches	With Standard Shank			Bronze General Purpose Furnished with Mandrel	Hardened Steel For hard, rough parts or carbide, ceramic, etc. Order Separately
69,60-73,02	2.740-2.875	Y88-2750PG	ST-2750	See All Stone Tables At Right	PG-B	PG-B-JQ6X ⁺
72,77-76,20	2.865-3.000	Y88-2875PG	ST-2875		PG-B	PG-B-JQ6X ⁺
75,95-79,37	2.990-3.125	Y88-3000PG	ST-3000		PG-B	PG-B-JQ6X ⁺
79,12-82,55	3.115-3.250	Y88-3125PG	ST-3125		PG-B	PG-B-JQ6X ⁺

Truing Sleeve

Select the truing sleeve whose bore diameter is just under finish size.
Hone or bore this sleeve .127mm (.005") from finish size.

Superabrasive Stone Inserted Guide Shoes are available for situations where a longer life shoe is needed. Contact Customer Service for price and availability.
(See NOTE below)

NOTES: Standard Keyway Mandrels not suitable for blind holes. Blind Hole Keyway Mandrels and Stones are available on special order basis. Contact Customer Service.

These honing units are designed to be used for honing bores with keyways, splines, ports and other surface interruptions.

Keyway Mandrels *must* be trued accurately to keep the honing stone from hanging up in the keyway. Size Truing Sleeve to a diameter between the desired finish bore size and .127 mm (.005") under.

Y88 Mandrel Replacement Parts

Y88-W	Wedge Replace when wear <i>begins</i> to show
Y88L-W	Wedge Plate (Low)
Y88H-W	Wedge Plate (High) Replace when wear <i>begins</i> to show
LN-1667A	Shoe Clamp Set 4 clamps with screws
LN-1695A	Tension Block
LN-1545A	Set Screw Only (pkg. of 2)
LN-1665A	Main Slot Wear Plate Not shown

CBN and Diamond Stones for Keyway Mandrels⁺ Metal Bond

These Stones consist of a single stone mounted centrally in a metal holder.

NOTE:

Superabrasive Stone Inserted Guide Shoe Mandrels⁺

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

⁺ Special Order - Contact Customer Service

Y88

Keyway Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

* 1st choice
** 2nd choice.
Use if A55 does not cut.

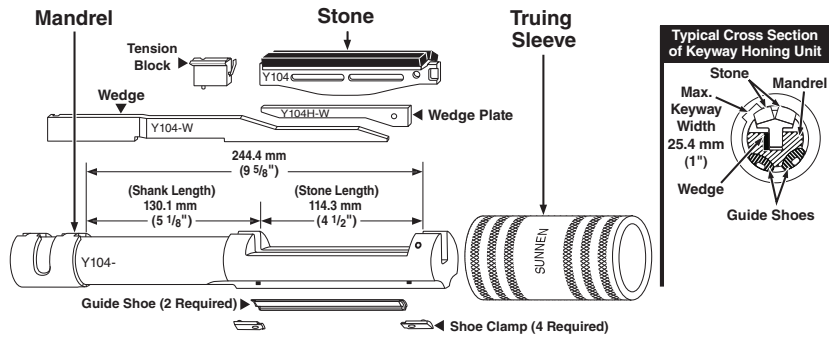
All Available Stones											
			Grit Size								
			70	80	100	150	220	280	320	400	500
Hard--Soft			Aluminum Oxide Stones (A) - 1 per box								
						Y88-A45	Y88-A55 Y88-A57	Y88-A63			
Hard--Soft			Silicon Carbide Stones (J,C) - 1 per box								
							Y88-J57			Y88-J85	Y88-J95

Recommended Stones for Y88 Mandrels						
Material	Low-Volume			High-Volume		
	Stone to use	Approx. R _a Surface Finish		Stone to use	Approx. R _a Surface Finish	
		µm	µin		µm	µin
Fast removal: deburred, ground, reamed holes						
Aluminum	Y88-J57	1,38	55	—	—	—
Brass, Soft	Y88-J63	0,83	33	—	—	—
Bronze	Y88-J57	1,38	55	Y88-J57	1,38	55
Carbide	—	—	—	—	—	—
Cast Iron	Y88-J57	0,50	20	—	—	—
Ceramic	—	—	—	—	—	—
Glass	—	—	—	—	—	—
Steel, Soft	Y88-A57	0,65	25	—	—	—
Steel, Hardened*	Y88-A55	0,45	18	—	—	—
Steel, Hardened**	Y88-A63	0,30	12	—	—	—
Fine finishing: previously honed holes						
Aluminum	Y88-J95	0,30	12	—	0,83	33
Brass, Soft	Y88-J85	0,40	16	Y88-J83	0,40	16
Bronze	Y88-J95	0,30	12	Y88-J95	0,30	12
Carbide	—	—	—	—	0,08	3
Cast Iron	Y88-J95	0,13	5	—	0,13	5
Ceramic	—	—	—	—	0,38	15
Glass	—	—	—	—	0,38	15
Steel, Soft	Y88-J95	0,10	4	—	0,40	16
Steel, Hardened	Y88-J85	0,13	5	—	0,18	7

Y104

Keyway Honing Units

Diameter Range:
82,30 mm – 98,42 mm
3.240" – 3.875"



Order 1-3 For Complete Y104 Keyway Honing Units

Diameter Range 82,30 mm - 98,42 mm 3.240" - 3.875"		1 Y88 Mandrel	2 Truing Sleeve	3 Honing Stone	Replacement Guide Shoes ^{2 required}	
mm	inches	With Standard Shank			Bronze General Purpose Furnished with Mandrel	Hardened Steel For hard, rough parts or carbide, ceramic, etc. Order Separately
82,30-85,72	3.240-3.375	Y104-3250PH	ST-3250	See All Stone Tables At Right	PH-B	PH-B-JQ6X ⁺
85,47-88,90	3.365-3.500	Y104-3375PH	ST-3375		PH-B	PH-B-JQ6X ⁺
88,65-92,07	3.490-3.625	Y104-3500PH	ST-3500		PH-B	PH-B-JQ6X ⁺
91,82-95,25	3.615-3.750	Y104-3625PH	ST-3625		PH-B	PH-B-JQ6X ⁺
95,00-98,42	3.740-3.875	Y104-3750PH	ST-3750		PH-B	PH-B-JQ6X ⁺

Truing Sleeve

Select the truing sleeve whose bore diameter is just under finish size.
Hone or bore this sleeve .127mm (.005") from finish size.

Superabrasive Stone Inserted Guide Shoes are available for situations where a longer life shoe is needed. Contact Customer Service for price and availability.
(See NOTE below)

NOTES: Standard Keyway Mandrels not suitable for blind holes. Blind Hole Keyway Mandrels and Stones are available on special order basis. Contact Customer Service.

These honing units are designed to be used for honing bores with keyways, splines, ports and other surface interruptions.

Keyway Mandrels *must* be trued accurately to keep the honing stone from hanging up in the keyway. Size Truing Sleeve to a diameter between the desired finish bore size and .127 mm (.005") under.

Y104 Mandrel Replacement Parts

Y104-W	Wedge Replace when wear <i>begins</i> to show
Y104L-W	Wedge Plate (Low)
Y104H-W	Wedge Plate (High) Replace when wear <i>begins</i> to show
LN-1677A	Shoe Clamp Set 4 clamps with screws
LN-1695A	Tension Block
LN-1545A	Set Screw Only (pkg. of 2)
LN-1665A	Main Slot Wear Plate Not shown

CBN and Diamond Stones for Keyway Mandrels⁺

Metal Bond
These Stones consist of a single stone mounted centrally in a metal holder.

NOTE:

Superabrasive Stone Inserted Guide Shoe Mandrels⁺

For applications where a long lasting mandrel is needed and the material being honed reacts negatively with a hardened mandrel. Made from a bronze mandrel. Single or double insert mandrels in either CBN or diamond are available.

⁺ Special Order - Contact Customer Service

Y104

Keyway Honing Units

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

* 1st choice
** 2nd choice.
Use if A55 does not cut.



All Available Stones

	Grit Size									
	70	80	100	150	220	280	320	400	500	600 1200
Hard--Soft	Aluminum Oxide Stones (A) & Silicon Carbide (J)									
				Y104-A47	Y104-A57	Y104-A63			Y104-J95	
						Y104-J63				
						Y104-J67				

Recommended Stones for Y88 Mandrels

Material	Low-Volume		High-Volume	
	Stone to use	Approx. R _a Surface Finish µm µin	Stone to use	Approx. R _a Surface Finish µm µin
Fast removal: deburred, bored, ground, reamed holes				
Aluminum	Y104-J63	1,85 55	—	—
Brass, Soft	Y104-J63	0,85 33	Y104-J63	0,83 33
Bronze	Y104-J63	0,85 33	Y104-J63	0,85 33
Carbide	—	—	—	0,50 20
Cast Iron	—	—	—	—
Ceramic	—	—	—	—
Glass	—	—	—	—
Steel, Soft	Y104-A47	0,95 38	—	1,25 50
Steel, Hardened*	Y104-A47	0,50 20	—	1,00 40
Steel, Hardened**	Y104-A57	0,45 18	—	—
Fine finishing: previously honed holes				
Aluminum	Y104-J95	0,30 12	—	0,83 33
Brass, Soft	Y104-J95	0,30 12	Y104-J95	0,30 12
Bronze	Y104-J95	0,30 12	Y104-J95	0,30 12
Carbide	—	—	—	0,08 3
Cast Iron	Y104-J95	0,13 5	—	0,13 5
Ceramic	—	—	—	0,38 15
Glass	—	—	—	0,38 15
Steel, Soft	Y104-J95	0,10 4	—	—
Steel, Hardened	Y104-J95	0,08 3	—	—

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MBB, & LBB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MP3 & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

M Series

Mandrel Sets

The Easy Way To Order

Buying in sets, using a single part number, simplifies ordering and assures having the right Honing Unit needed for the job at hand. Each set covers a particular size range.

Each Honing Unit is supplied with a wedge and adapter. A truing sleeve is included for each Honing Unit.

You also save money, compared to list price of individual items, by ordering Mandrel Sets.

The Mandrel Units and Stone Assortments are sold separately.

NOTE: Components not assembled

Diameter Range:

1,52 mm – 2,03 mm
{.060" – .080"}



MLS-260S (Soft) or MLS-260H (Hardened) Mandrel Unit

10 Honing Units D2A-060 through D2E-078

1 SL-30 Mandrel Rack

SLN-60 Stone Assortment consists of 12 each of the following stones:

24	D6A65	Stones	12	D6J67	Stones
12	D6A67	Stones	12	D6J93	Stones
12	D6J65	Stones	12	D6J97	Stones

Diameter Range:

3,05 mm – 6,22 mm
{.120" – .245"}



MLS-125S (Soft) or MLS-125H (Hardened) Mandrel Unit

25 Honing Units

K4-120 thru K4-145

K6-185 thru K6-240

K5-150 thru K5-180

2 SL-30 Mandrel Racks

SLN-125 Stone Assortment consists of 12 each of the following stones:

12	K4A63	Stones	12	K5J63	Stones
12	K4A65	Stones	12	K5J67	Stones
12	K4A67	Stones	12	K5J83	Stones
12	K4A69	Stones	12	K5J95	Stones
12	K4J65	Stones	12	K6A413	Stones
12	K4J67	Stones	12	K6A55	Stones
12	K4J85	Stones	12	K6A57	Stones
12	K4J95	Stones	12	K6A63	Stones
12	K5A63	Stones	12	K6J57	Stones
12	K5A65	Stones	12	K6J63	Stones
12	K5A67	Stones	12	K6J83	Stones
12	K5A69	Stones	12	K6J95	Stones

Diameter Range:
2,54 mm – 3,05 mm
{.100" – .120"}



MLS-100S (Soft) or MLS-100H (Hardened) Mandrel Unit

10 Honing Units K3-100 through K3-118

1 SL-30 Mandrel Rack

SLN-100 Stone Assortment consists of 12 each of the following stones:

24	K3A65	Stones	12	K3J65	Stones
12	K3A67	Stones	12	K3J67	Stones
12	K3A69	Stones	12	K3J85	Stones
			12	K3J95	Stones

Diameter Range:

2,03 mm – 2,54 mm
{.080" – .100"}



MLS-280S (Soft) or MLS-280H (Hardened) Mandrel Unit

10 Honing Units D2F-080 through D2F-098

1 SL-30 Mandrel Rack

SLN-80 Stone Assortment consists of 12 each of the following stones:

24	D8A65	Stones	12	D8J67	Stones
12	D8A67	Stones	12	D8J97	Stones
12	D8J65	Stones	12	D8J95	Stones

Diameter Range:

6,22 mm – 18,90 mm
{.245" – .744"}



MLS-250S (Soft) or MLS-250H (Hardened) Mandrel Unit

36 Honing Units

K8-245 thru K8-300

K16-495 thru K16-588

K10-308 thru K10-362

K20-619 thru K20-713

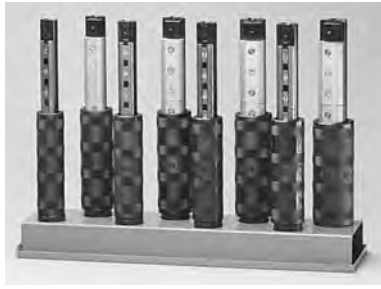
K12-370 thru K12-479

3 SL-30 Mandrel Racks

SLN-250 Stone Assortment consists of 12 each of the following stones:

12	K10A413	Stones	12	K16J57	Stones
12	K10A55	Stones	12	K16J63	Stones
12	K10A57	Stones	12	K16J83	Stones
12	K10A63	Stones	12	K16J95	Stones
12	K10J57	Stones	12	K20A413	Stones
12	K10J63	Stones	12	K20A55	Stones
12	K10J83	Stones	12	K20A57	Stones
12	K10J95	Stones	12	K20A63	Stones
12	K12A413	Stones	12	K20J57	Stones
12	K12A55	Stones	12	K20J63	Stones
12	K12A57	Stones	12	K20J83	Stones
12	K12A63	Stones	12	K20J95	Stones
12	K12J57	Stones	12	K8A413	Stones
12	K12J63	Stones	12	K8A55	Stones
12	K12J83	Stones	12	K8A57	Stones
12	K12J95	Stones	12	K8A63	Stones
12	K16A413	Stones	12	K8J57	Stones
12	K16A55	Stones	12	K8J63	Stones
12	K16A57	Stones	12	K8J83	Stones
12	K16A63	Stones	12	K8J95	Stones

Diameter Range:
25,15 mm – 44,45 mm
{.990" – 1.750"}



MLS-1000 Mandrel Unit

- 8 Honing Units
- 2G-P28-1000VA through 2G-P28-1625WD
- 1 SL-38 Mandrel Rack
- 1 2G-R28 Blind Hole Wedge
- 1 LN-570A Concentric Sleeve

SLN-1000 Stone Assortment consists of 12 each of the following stones:

12	P28A413	Stones	12	R28A413	Stones
12	P28A55	Stones	12	R28A55	Stones
12	P28A57	Stones	12	R28A57	Stones
12	P28A63	Stones	12	R28A63	Stones
12	P28J57	Stones	12	R28J57	Stones
12	P28J63	Stones	12	R28J63	Stones
12	P28J83	Stones	12	R28J83	Stones
12	P28J95	Stones	12	R28J95	Stones

Diameter Range:
1/4" – 1.031" {Fractional
Sizes Only}



MLS-25S (Soft) or MLS-25H (Hardened) Mandrel Unit

Order M-25S for honing most materials including hard steels; order M-25H for rough holes and very hard materials.

21 Honing Units		
1 K8-245	1 K12-370	1 AK20-744UA
1 K8-260	1 K12-400	1 AK20-806UB
1 K8-275	1 K12-432	1 AK20-869UB
1 K8-290	1 K12-463	1 AK20-931UC
1 K10-308	1 K16-495	1 AK20-994UC
1 K10-323	1 K16-557	2 SL-30 Mandrel Racks
1 K10-339	1 K20-619	
1 K10-354	1 K20-681	

SLN-250 Stone Assortment consists of 12 each of the following stones:

12	K10A413	Stones	12	K16J57	Stones
12	K10A55	Stones	12	K16J63	Stones
12	K10A57	Stones	12	K16J83	Stones
12	K10A63	Stones	12	K16J95	Stones
12	K10J57	Stones	12	K20A413	Stones
12	K10J63	Stones	12	K20A55	Stones
12	K10J83	Stones	12	K20A57	Stones
12	K10J95	Stones	12	K20A63	Stones
12	K12A413	Stones	12	K20J57	Stones
12	K12A55	Stones	12	K20J63	Stones
12	K12A57	Stones	12	K20J83	Stones
12	K12A63	Stones	12	K20J95	Stones
12	K12J57	Stones	12	K8A413	Stones
12	K12J63	Stones	12	K8A55	Stones
12	K12J83	Stones	12	K8A57	Stones
12	K12J95	Stones	12	K8A63	Stones
12	K16A413	Stones	12	K8J57	Stones
12	K16A55	Stones	12	K8J63	Stones
12	K16A57	Stones	12	K8J83	Stones
12	K16A63	Stones	12	K8J95	Stones

M Series Mandrel Sets

Diameter Range:
43,94 mm – 66,68 mm
{1.730" – 2.625"}



MLS-1750 Mandrel Unit

Assembled for open hole work—all necessary items included to convert units for blind hole work.

- 7 Honing Units
 - 1 2G-P28-1750WE
 - 1 2H-P28-1875WE
 - 1 2H-P28-2000WF
 - 1 2H-P28-2125WF
 - 1 2G-R28 Blind Hole Wedge
 - 1 2H-R28 Blind Hole Wedge
 - 1 SL-37 Mandrel Rack
- 1 2H-P28-2250WF
- 1 2H-P28-2375WG
- 1 2H-P28-2500WG

SLN-1000 Stone Assortment consists of 12 each of the following stones:

12	P28A413	Stones	12	R28A413	Stones
12	P28A55	Stones	12	R28A55	Stones
12	P28A57	Stones	12	R28A57	Stones
12	P28A63	Stones	12	R28A63	Stones
12	P28J57	Stones	12	R28J57	Stones
12	P28J63	Stones	12	R28J63	Stones
12	P28J83	Stones	12	R28J83	Stones
12	P28J95	Stones	12	R28J95	Stones

Diameter Range:
18,90 mm – 26,19 mm
{.744" – 1.031"}



MLS-744 Mandrel Unit

- 9 Honing Units AK20-744UA through AK20-944UC
- 1 SL-30 Mandrel Rack

SLN-744 Stone Assortment consists of 12 each of the following stones:

12	K20A413	Stones	12	K20J57	Stones
12	K20A55	Stones	12	K20J63	Stones
12	K20A57	Stones	12	K20J83	Stones
12	K20A63	Stones	12	K20J95	Stones

Mandrel Storage Racks

SL-30
For Mandrels requiring separate adapters. Each rack holds 16 honing units. Includes drain pan.



SL-38
For lifetime honing units with 38,1 mm (1-1/2") diameter shank. Rack holds 8 units. Includes drain pan.



SL-37
For lifetime honing units with 44,4 mm (1-3/4") diameter shank. Rack holds 7 units. Includes drain pan.



SRT Multi-Stone Hone Head

For Diameter Range

Stone Set	SRT-1375		SRT-1500		SRT-1600		SRT-2000		SRT-2530		SRT-3000	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
SRT00-XXXX	34.9-36.5	1.375-1.438	—	—	—	—	—	—	—	—	—	—
SRT0-XXXX	36.5-38.1	1.438-1.500	—	—	—	—	—	—	—	—	—	—
SRT1-XXXX	38.1-40.1	1.500-1.580	38.1-40.1	1.500-1.580	41.1-42.7	1.600-1.680	51.3-52.8	2.000-2.080	64.7-66.3	2.530-2.610	64.7-66.3	2.530-2.610
SRT2-XXXX	40.1-42.2	1.580-1.660	40.1-42.2	1.580-1.660	42.7-44.7	1.680-1.760	52.8-54.9	2.080-2.160	66.3-68.3	2.610-2.690	66.3-68.3	2.610-2.690
SRT3-XXXX	42.2-44.2	1.660-1.740	42.2-44.2	1.660-1.740	44.7-46.7	1.760-1.840	54.9-56.9	2.160-2.240	68.3-70.4	2.690-2.770	68.3-70.4	2.690-2.770
SRT4-XXXX	—	—	44.2-46.2	1.740-1.820	46.7-48.8	1.840-1.920	56.9-58.9	2.240-2.320	70.4-72.4	2.770-2.850	70.4-72.4	2.770-2.850
SRT5-XXXX	—	—	46.2-48.3	1.820-1.900	48.8-50.8	1.920-2.000	58.9-61.0	2.320-2.400	72.4-74.4	2.850-2.930	72.4-74.4	2.850-2.930
SRT6-XXXX	—	—	48.3-50.3	1.900-1.980	50.8-52.8	2.000-2.080	61.0-63.0	2.400-2.480	74.4-76.5	2.930-3.010	74.4-76.5	2.930-3.010
SRT7-XXXX	—	—	50.3-52.3	1.980-2.060	52.8-54.9	2.080-2.160	63.0-65.0	2.480-2.560	76.5-78.5	3.010-3.090	76.5-78.5	3.010-3.090

XXXX = Order abrasive type and grit size from chart below.

Diamond (D or R) & CBN (N) — Metal (M) Bond — 6 per Set

100	150	220	280	400	500	600
		DM55				DM05
					RMG97	
		NMG55		NMG85		
NMG37	NMG47		NMG67	NMG87		

Abrasives are special order - Contact Customer Service for Availability.

Alignment Bushings

CRC-2120	CRC-2330
CRC-2220	CRC-2370
CRC-2240	CRC-2420
CRC-2270	CRC-2490

Note: For additional sizes contact Customer Service for price and availability.



* Special Order - Contact Customer Service

Recommended Stone Sets for AN-600

For Holes Without Keyways

For Holes With Keyways

General Purpose Stone Sets
(2 Stones and 2 Guides)

Guideless Stone Sets

Keyway Stone Sets

Maximum Keyway Width
20.3mm (.8") 22.8mm (.9") 30.4mm (1.2") 35.5mm (1.4")

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MBB, & LBB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MP3 & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

Hole
Diameters

64 to 69mm (2.5"-2.7")
69 to 104mm (2.7"-4.1")
89 to 140mm (3.5"-5.5")
104 to 165.1mm (4.1"-6.5")

64 to 84mm (2.5"-3.3")
84 to 107mm (3.3"-4.2")
102 to 142mm (4.0"-5.6")
114 to 165.1mm (4.5"-6.5")

64 to 84mm (2.5"-3.3")
84 to 107mm (3.3"-4.2")
102 to 142mm (4.0"-5.6")
114 to 165.1mm (4.5"-6.5")

Fast stock removal: deburred, bored, ground, reamed holes

Aluminum	G25-J45	M27-J45	N37-J45	W47-J45	GG25-J45	MM33-J45	NN40-J45	WW51-J45	GY25-J45	MY33-J45	NY40-J45	WY51-J45
Brass, Soft	G25-J65	M27-J65	N37-J65	W47-J65	GG25-J65	MM33-J65	NN40-J65	WW51-J65	GY25-J65	MY33-J65	NY40-J65	WY51-J65
Bronze	G25-J45	M27-J45	N37-J45	W47-J45	GG25-J45	MM33-J45	NN40-J45	WW51-J45	GY25-J45	MY33-J45	NY40-J45	WY51-J45
Carbide	G25-DV57	M27-DV57	N37-DV57	W47-DV57	—	—	—	—	—	—	—	—
Cast iron	G25-J45	M27-J45	N37-J45	W47-J45	GG25-J45	MM33-J45	NN40-J45	WW51-J45	GY25-J45	MY33-J45	NY40-J45	WY51-J45
Ceramic	—	—	—	—	—	—	—	—	—	—	—	—
Glass	—	—	—	—	—	—	—	—	—	—	—	—
Steel, Soft	G25-A45	M27-A45	N37-A45	W47-A45	GG25-A45	MM33-A45	NN40-A45	WW51-A45	GY25-A45	MY33-A45	NY40-A45	WY51-A45
Steel, Hardened	G25-A45	M27-A45	N37-A45	W47-A45	GG25-A45	MM33-A45	NN40-A45	WW51-A45	GY25-A45	MY33-A45	NY40-A45	WY51-A45
Steel, Hardened (if A43 does not cut)	G25-NR53	M27-NR53	N37-NR53	W47-NR53	—	—	—	—	—	—	—	—

Fine finishing: previously honed holes

Aluminum	G25-J87	M27-J87	N37-J87	W47-J87	GG25-J87	MM33-J85	NN40-J87	WW51-J87	GY25-J87	MY33-J87	NY40-J87	WY51-J87
Brass, Soft	G25-J85	M27-J85	N37-J85	W47-J85	GG25-J85	MM33-J87	NN40-J85	WW51-J85	GY25-J85	MY33-J85	NY40-J85	WY51-J85
Bronze	G25-J87	M27-J87	N37-J87	W47-J87	GG25-J87	MM33-J87	NN40-J87	WW51-J87	GY25-J87	MY33-J87	NY40-J87	WY51-J87
Carbide	—	—	—	—	—	—	—	—	—	—	—	—
Cast iron	G25-J87	M27-J87	N37-J87	W47-J87	GG25-J87	—	NN40-J87	WW51-J87	GY25-J87	MY33-J87	NY40-J87	WY51-J87
Ceramic	—	—	—	—	—	—	—	—	—	—	—	—
Glass	—	—	—	—	—	—	—	—	—	—	—	—
Steel, Hard	G25-J85	M27-J85	N37-J85	W47-J85	GG25-J85	MM33-J85	NN40-J85	WW51-J85	GY25-J85	MY33-J85	NY40-J85	WY51-J85
Steel, Soft	G25-J87	M27-J87	N37-J87	W47-J87	GG25-J87	MM33-J87	NN40-J87	WW51-J87	GY25-J87	MY33-J87	NY40-J87	WY51-J87

† These stones require the use of Master Holders.

CBN and Diamond Stones

Metal Bond

Use to increase stock removal rates or abrasive life when compared to A or J stones, resin or vitrified diamond and CBN stones. First time users of metal bond superabrasive stone sets must order ___-KB5X (G25-KB5X) Master Holder Set. Replacement stone can be ordered without reordering KB5X Master Holders.

* Special Order - Contact Customer Service

Master Holder Number	Stone Set Number	Diameter Range mm	inches
G25-KB5X	G25-___-XG55	64-69	2.5-2.7
M27-KB5X	M27-___-XG55	69-104	2.7-4.1
N37-KB5X	N37-___-XG55	89-140	3.5-5.5
W47-KB5X	W47-___-XG55	104-533	4.1-6.5

The ___ in the stone set number is for the metal bond abrasive code. This set consists of two L16 superabrasive stones and two roughing guides. Select the L16 metal bond superabrasive stone desired from the stone selection guide found on page 2.33. Contact Customer Service for price and availability.

Resin or Vitrified Bond

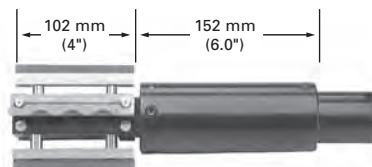
For honing carbide, ceramic, glass and hardened steel. Available in 82,55 mm (3-1/4") or 101.6 mm (4") stone length. For 82,55 mm (3-1/4") length add -85 to stone number.

Diamond Stone	CBN Stone
DV47	NR53 Resin Bond
DV57	NR83 Resin Bond
DV87	—
DV07	—

AN-600 Honing Head

Diameter Range: 63,5 mm - 165,0 mm (2.500"-6.500")

For use with Sunnen Honing Machine, for honing large bores. Accuracy to 0,013 mm (.0005"). Uses G25, M27, N37, W47, GG25, MM33, NN40, WW51, GY25, MY33, NY40, or WY51 Stone Sets, depending upon the bore diameter. Honing stone length 102 mm (4"). Order stones separately. Not suitable for power honing over 95 mm (3.75") diameter. See above for Recommended Stone Chart.



Finish figures apply only if Sunnen Industrial Honing Oil is used.

Retractable Mandrels

The Sunnen KR and BLR series of honing mandrels with retractable stone assemblies ensure greater efficiency in virtually all bore sizing and finishing operations.

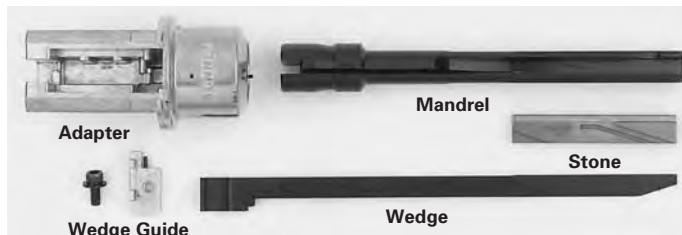


The new retractable KR mandrel series is available for diameter ranges from .185"-.744" (4,70-18,90 mm). The longer BLR series of retractable mandrels is also available for the same diameter range, and incorporates a longer stone.

Retractable mandrel and stone assemblies are available at the same price as the non-retractable mandrel units.

Benefits of Sunnen's Retractable Mandrels:

- Stones are retracted from the cutting position for much easier loading and unloading of parts which increases production and lowers manufacturing costs.
- Stronger mandrels remove stock at a faster rate, increasing production speeds and lowering cost per part honed.
- Units come with extended wear surfaces (shoes) standard, in either hard steel or plated diamond. This ensures longer service life and significantly reduces centerline changes from cycle to cycle. Also, downtime is lowered which increases productivity and reduces unit costs.
- Mandrel units have hardened wedges to prolong wedge life. This assures high performance honing from start to finish for better cost efficiency.
- The stone retraction feature is ideal for use in automated applications facilitating loading and unloading, reducing labor costs.
- Retraction marks and scratches that can occur when taking the part off the mandrel after honing are greatly minimized. This ensures a consistently higher-quality end product.



Retractable Mandrel Options

Diamond Plated Super Mandrels —

Designed to provide a long-wearing guide shoe to increase mandrel life in some applications...plus faster stock removal in difficult materials (chrome, carbide). Plated with 220 grit diamond.

Carbide Shoe Mandrels —

(Available on Special Order)

Two types of Carbide Shoe Mandrels are available for high-production applications. Available in either Round Carbide Rod Inserted and Full Carbide Shoe Mandrels. In the correct application they will last significantly longer than standard hardened mandrels and prevent galling in exotic materials such as 303 stainless steel. When ordering full-carbide type specify starting and finish diameter.

Extended Shank Mandrels —

(Available on Special Order)

Extended Shank Mandrels are available for honing parts that are too long to be honed with a standard mandrel.

Metal Bond Superabrasive Insert Mandrels —

(Available on Special Order)

For applications where a long lasting mandrel is needed and the materials being honed reacts negatively with either a hardened or carbide shoe mandrel. Single or double insert mandrels in either CBN or diamond are available.

How To Order

To order a retractable KR-16 or BLR-16 13,36 mm - 14,15 mm (.526"-.557") diameter mandrel, simply add "R" after the "K" or after the "BL" from the corresponding table on pages 2.14 - 2.44 in this catalog. SEE EXAMPLE BELOW (from page 2.30 of catalog):

Order 1-5 For Complete K16 or J-K16 Honing Units

Diameter Range 12,57 mm - 15,72 mm .495" - .619"		1 K16 Mandrel Includes wedge	1 J-K16 Mandrel Includes wedge	2 Truing Sleeve	3 Adapter For J-K16 mandrels order J-K16-A adapter	4 Alignment Bushing	5 Honing Stone
mm	inches	Mandrel With Standard Shank Choose One Suffix	Steel Mandrel With Extra-Long Shank Choose One Suffix		With stone retainer and wedge guide	For machines with fully adjustable spindle nose	
12,57-13,36	.495-.526	K16-495A H SD	J-K16-495A H SD	S-495	K16-A	C-495	Contact Customer Service For Availability
13,36-14,15	.526-.557	K16-526A H SD	J-K16-526A H SD	S-526	K16-A	C-526	
14,15-14,94	.557-.588	K16-557A H SD	J-K16-557A H SD	S-557	K16-A	C-557	
14,94-15,72	.588-.619	K16-588A H SD	J-K16-588A H SD	S-588	K16-A	C-588	

H = hardened steel
SD = diamond plated

Example: KR16-526AH

KR16-A

KR16- _ _ _ _

* Special Order - Contact Customer Service

Plated diamond tools

INTRODUCTION

CGT KROSSGRINDING® tools are free-cutting, full contact tools that provide extreme accuracy, excellent stock removal capability and durable diamond grit for long tooling life. These tools provide consistent bore size and unparalleled roundness, holding tolerances to within 0,00025 mm (0.000010 inch). The plated diamond tooling expands during the honing process and provides cutting rates superior to grinding or other bore sizing processes. Tool wear is reduced to a point next to zero per piece, and the process can provide a controlled or even plateau surface finish with a crosshatch pattern similar to that produced by the standard honing process.

APPROXIMATE SURFACE FINISHES

The surface finishes shown in the following chart are approximate. Actual surface finish will vary, depending on your particular operation, type and hardness of material being finished, and tool condition.



Approximate Surface Finish

Material	D1-70		D3-100		Grit Size		D7-320		D8-400		D00-1200	
	μm	μin	μm	μin	μm	μin	μm	μin	μm	μin	μm	μin
Soft Steel	1,17-2,39	46-94	0,69-1,52	27-60	0,36-0,89	14-35	0,25-0,69	10-27	0,15-0,51	6-20	0,05-0,28	2.00-11
Hard Steel	0,51-1,52	20-60	0,30-0,97	12-38	0,18-0,53	7-21	0,13-0,41	5-16	0,08-0,21	3-11	0,02-0,10	.80-4
Aluminum	0,97-2,46	38-97	0,61-1,93	24-76	0,30-1,02	12-40	0,25-0,69	10-27	0,18-0,41	7-16	0,08-0,13	3.00-5
Cast Iron	0,61-2,39	24-94	0,38-1,52	15-60	0,23-0,89	9-35	0,15-0,71	6-28	0,10-0,56	4-22	0,03-0,33	1.30-13
Bronze	0,94-2,84	37-112	0,61-1,80	24-71	0,25-0,99	10-39	0,20-0,71	8-28	0,10-0,53	4-21	0,02-0,20	.80-8
Carbide	0,79-0,97	31-38	0,43-0,61	17-24	0,18-0,36	7-14	0,10-0,28	4-11	0,05-0,18	2-7	0,01-0,03	.25-7
Copper	0,94-2,84	37-112	0,61-1,80	24-71	0,25-0,99	10-39	0,20-0,71	8-28	0,10-0,53	4-21	0,02-0,20	.80-8
Brass	1,07-2,84	42-112	0,61-1,80	24-71	0,28-0,99	11-39	0,23-0,71	9-28	0,13-0,53	5-21	0,03-0,20	1.00-8

Surface Finish in Micrometers - μm and Microinches - μ" Ra

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MBB, & LBB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MP3 & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

KROSSGRINDING® Tooling and Alignment Bushing

Superabrasive KROSSGRINDING® Tools Selection Guide

How to Use Selection Guide

- Select Diameter Range
- Located Tool Part Number: **CGT 36.- 1125- D***
 - KROSSGRINDING® Tool
 - Tool Family
 - Nominal Size
 - Grit Size (D - Diamond)
- Grit Sizes Available
(See D* in the following Selection Guide):

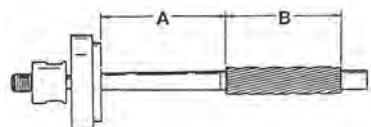
D1 - 70 Grit	D7 - 320 Grit
D3 - 100 Grit	D8 - 400 Grit
D5 - 220 Grit	D0 - 600 Grit

Alignment Bushings

For aligning tool with adjustable spindle nose, use Sunnen Runout Indicator Assembly (CGM-4005).

Accurate centering of Sunnen KROSSGRINDING® Tools requires a concentric Alignment Bushing. The ID of the bushing should be the same as the starting diameter of the workpiece.

For workpieces whose starting diameters fall between the diameters listed, the bushing should be honed out to the workpiece starting diameter.



Allow two weeks delivery for CGT Tools

Standard CGT tools are designed to produce bores within 0,005 mm straight and round in uninterrupted bores of abrasive length after sizing a reasonable number of bores to find the optimum operating setup. CGT tools may produce bores within 0,001 mm straight and round with the limited use of a Diamond Conditioning sleeve (DCS). These conditioning sleeves only remove or flatten a fraction of the percentage of the available grits so no great loss of tool life is expected. Results will be dependent on applications. Sunnen will verify tools to produce required straight and round specification on a test bushing for an added charge. There may also be an added one-time charge for tooling if the projected sales of the specific tool is not large enough for Sunnen to absorb the added capital expense.

KROSSGRINDING® Tool/Alignment Bushing Selection Guide

Nominal Size		Diameter Range of Tool		Tool (D*-See How to Use) Part No.	A Shank Length		B Abrasive Length		Alignment Bushing Part No.	Nominal Size		Diameter Range of Tool		Tool (D*-See How to Use) Part No.	A Shank Length		B Abrasive Length		Alignment Bushing Part No.
mm	in	mm	in		mm	in	mm	in		mm	in	mm	in		mm	in	mm	in	
5,54	.218	5,46-5,59	.215-.220	CGT7-218-D*	34,92	1.375	41,3	1.626	CGC-218	8,08	.318	8,00-8,15	.315-.321	CGT10-318-D*	44,45	1.750	47,62	1.875	CGC-315
5,61	.221	5,54-5,66	.218-.223	CGT7-221-D*	34,92	1.375	41,3	1.626	CGC-221	8,15	.321	8,08-8,23	.318-.324	CGT10-321-D*	44,45	1.750	47,62	1.875	CGC-318
5,69	.224	5,61-5,74	.221-.226	CGT7-224-D*	34,92	1.375	41,3	1.626	CGC-224	8,23	.324	8,15-8,31	.321-.327	CGT10-324-D*	44,45	1.750	47,62	1.875	CGC-321
5,77	.227	5,69-5,82	.224-.229	CGT7-227-D*	34,92	1.375	41,3	1.626	CGC-227	8,31	.327	8,23-8,38	.324-.330	CGT10-327-D*	44,45	1.750	47,62	1.875	CGC-324
5,84	.230	5,77-5,89	.227-.232	CGT7-230-D*	34,92	1.375	41,3	1.626	CGC-230	8,38	.330	8,31-8,46	.327-.333	CGT10-330-D*	44,45	1.750	47,62	1.875	CGC-327
5,92	.233	5,84-5,97	.230-.235	CGT7-233-D*	34,92	1.375	41,3	1.626	CGC-233	8,46	.333	8,38-8,53	.330-.336	CGT10-333-D*	44,45	1.750	47,62	1.875	CGC-330
5,99	.236	5,92-6,05	.233-.238	CGT7-236-D*	34,92	1.375	41,3	1.626	CGC-236	8,53	.336	8,46-8,61	.333-.339	CGT10-336-D*	44,45	1.750	47,62	1.875	CGC-333
6,07	.239	5,99-6,12	.236-.241	CGT7-239-D*	34,92	1.375	41,3	1.626	CGC-239	8,61	.339	8,53-8,69	.336-.342	CGT10-339-D*	44,45	1.750	47,62	1.875	CGC-336
6,15	.242	6,07-6,20	.239-.244	CGT7-242-D*	34,92	1.375	41,3	1.626	CGC-242	8,69	.342	8,61-8,76	.339-.345	CGT10-342-D*	44,45	1.750	47,62	1.875	CGC-339
6,22	.245	6,15-6,27	.242-.247	CGT7-245-D*	34,92	1.375	41,3	1.626	CGC-245	8,76	.345	8,69-8,84	.342-.348	CGT10-345-D*	44,45	1.750	47,62	1.875	CGC-342
6,30	.248	6,22-6,35	.245-.250	CGT7-248-D*	34,92	1.375	41,3	1.626	CGC-247	8,84	.348	8,76-8,92	.345-.351	CGT10-348-D*	44,45	1.750	47,62	1.875	CGC-345
6,35	.250	6,27-6,40	.247-.252	CGT8-250-D*	44,45	1.750	44,45	1.750	CGC-247	8,92	.351	8,84-8,99	.348-.354	CGT10-351-D*	44,45	1.750	47,62	1.875	CGC-348
6,43	.253	6,35-6,48	.250-.255	CGT8-253-D*	44,45	1.750	44,45	1.750	CGC-250	8,99	.354	8,92-9,07	.351-.357	CGT10-354-D*	44,45	1.750	47,62	1.875	CGC-351
6,50	.256	6,43-6,55	.253-.258	CGT8-256-D*	44,45	1.750	44,45	1.750	CGC-253	9,07	.357	8,99-9,14	.354-.360	CGT10-357-D*	44,45	1.750	47,62	1.875	CGC-354
6,58	.259	6,50-6,63	.256-.261	CGT8-259-D*	44,45	1.750	44,45	1.750	CGC-256	9,14	.360	9,07-9,22	.357-.363	CGT10-360-D*	44,45	1.750	47,62	1.875	CGC-357
6,65	.262	6,58-6,71	.259-.264	CGT8-262-D*	44,45	1.750	44,45	1.750	CGC-259	9,22	.363	9,14-9,30	.360-.366	CGT10-363-D*	44,45	1.750	47,62	1.875	CGC-360
6,73	.265	6,66-6,78	.262-.267	CGT8-265-D*	44,45	1.750	44,45	1.750	CGC-262	9,30	.366	9,22-9,37	.363-.369	CGT10-366-D*	44,45	1.750	47,62	1.875	CGC-363
6,81	.268	6,73-6,86	.265-.270	CGT8-268-D*	44,45	1.750	44,45	1.750	CGC-265	9,37	.369	9,30-9,45	.366-.372	CGT10-369-D*	44,45	1.750	47,62	1.875	CGC-366
6,88	.271	6,81-6,93	.268-.273	CGT8-271-D*	44,45	1.750	44,45	1.750	CGC-268	9,45	.372	9,37-9,53	.369-.375	CGT10-372-D*	44,45	1.750	47,62	1.875	CGC-369
6,96	.274	6,88-7,01	.271-.276	CGT8-274-D*	44,45	1.750	44,45	1.750	CGC-271	9,53	.375	9,42-9,63	.371-.379	CGT12-375-D*	46,02	1.812	50,80	2.000	CGC-371
7,04	.277	6,96-7,09	.274-.279	CGT8-277-D*	44,45	1.750	44,45	1.750	CGC-274	9,63	.379	9,53-9,73	.375-.383	CGT12-379-D*	46,02	1.812	50,80	2.000	CGC-375
7,11	.280	7,04-7,16	.277-.282	CGT8-280-D*	44,45	1.750	44,45	1.750	CGC-277	9,73	.383	9,63-9,83	.379-.387	CGT12-383-D*	46,02	1.812	50,80	2.000	CGC-379
7,19	.283	7,11-7,24	.280-.285	CGT8-283-D*	44,45	1.750	44,45	1.750	CGC-280	9,83	.387	9,73-9,93	.383-.391	CGT12-387-D*	46,02	1.812	50,80	2.000	CGC-383
7,26	.286	7,19-7,32	.283-.288	CGT8-286-D*	44,45	1.750	44,45	1.750	CGC-283	9,93	.391	9,83-10,03	.387-.395	CGT12-391-D*	46,02	1.812	50,80	2.000	CGC-387
7,34	.289	7,26-7,39	.286-.291	CGT8-289-D*	44,45	1.750	44,45	1.750	CGC-286	10,03	.395	9,93-10,13	.391-.399	CGT12-395-D*	46,02	1.812	50,80	2.000	CGC-391
7,42	.292	7,34-7,47	.289-.294	CGT8-292-D*	44,45	1.750	44,45	1.750	CGC-289	10,13	.399	10,03-10,24	.395-.403	CGT12-399-D*	46,02	1.812	50,80	2.000	CGC-395
7,49	.295	7,42-7,54	.292-.297	CGT8-295-D*	44,45	1.750	44,45	1.750	CGC-292	10,23	.403	10,13-10,34	.399-.407	CGT12-403-D*	46,02	1.812	50,80	2.000	CGC-399
7,57	.298	7,49-7,62	.295-.300	CGT8-298-D*	44,45	1.750	44,45	1.750	CGC-295	10,34	.407	10,24-10,44	.403-.411	CGT12-407-D*	46,02	1.812	50,80	2.000	CGC-403
7,65	.301	7,57-7,70	.298-.303	CGT8-301-D*	44,45	1.750	44,45	1.750	CGC-298	10,46	.412	10,36-10,57	.408-.416	CGT12-412-D*	46,02	1.812	50,80	2.000	CGC-408
7,72	.304	7,65-7,77	.301-.306	CGT8-304-D*	44,45	1.750	44,45	1.750	CGC-301	10,56	.416	10,46-10,67	.412-.420	CGT12-416-D*	46,02	1.812	50,80	2.000	CGC-412
7,80	.307	7,72-7,85	.304-.309	CGT8-307-D*	44,45	1.750	44,45	1.750	CGC-304	10,67	.420	10,57-10,77	.416-.424	CGT12-420-D*	46,02	1.812	50,80	2.000	CGC-416
7,87	.310	7,80-7,93	.307-.312	CGT8-310-D*	44,45	1.750	44,45	1.750	CGC-307	10,77	.424	10,67-10,87	.420-.428	CGT12-424-D*	46,02	1.812	50,80	2.000	CGC-420
7,92	.312	7,85-8,00	.309-.315	CGT10-312-D*	44,45	1.750	47,62	1.875	CGC-309	10,87	.428	10,77-10,97	.424-.432	CGT12-428-D*	46,02	1.812	50,80	2.000	CGC-424
8,00	.315	7,92-8,08	.312-.318	CGT10-315-D*	44,45	1.750	47,62	1.875	CGC-312	10,97	.432	10,87-11,07	.428-.436	CGT12-432-D*	46,02	1.812	50,80	2.000	CGC-428

NOTE: For bore diameter sizes below 5,46 mm (.215") and above 31,50 mm (1.260"), consult your Sunnen Field Engineer.

†NOTE: Not available in D1 (70 Grit).

***NOTE:** See How to Use Selection Guide

KROSSGRINDING® Tooling and Alignment Bushing

KROSSGRINDING® Tool/Alignment Bushing Selection Guide

Nominal Size		Diameter Range of Tool		Tool (D°-See How to Use) Part No.	A Shank Length		B Abrasive Length		Alignment Bushing	Nominal Size		Diameter Range of Tool		Tool (D°-See How to Use) Part No.	A Shank Length		B Abrasive Length		Alignment Bushing
					mm	in	mm	in							mm	in	mm	in	
11,08	.437	10,97-11,20	.432-.441	CGT14-437-D*	52,37	2.062	57,15	2.250	CGC-432	18,86	.743	18,67-19,05	.735-.750	CGT22-743-D*	85,70	3.374	82,55	3.250	CGC-735
11,18	.441	11,07-11,30	.436-.445	CGT14-441-D*	52,37	2.062	57,15	2.250	CGC-436	19,04	.750	18,82-19,25	.741-.758	CGT24-750-D*	92,05	3.624	88,90	3.500	CGC-741
11,31	.446	11,20-11,43	.441-.450	CGT14-446-D*	52,37	2.062	57,15	2.250	CGC-441	19,27	.759	19,05-19,48	.750-.767	CGT24-759-D*	92,05	3.624	88,90	3.500	CGC-750
11,44	.451	11,33-11,56	.446-.455	CGT14-451-D*	52,37	2.062	57,15	2.250	CGC-446	19,50	.768	19,28-19,71	.759-.776	CGT24-768-D*	92,05	3.624	88,90	3.500	CGC-759
11,57	.456	11,46-11,68	.451-.460	CGT14-456-D*	52,37	2.062	57,15	2.250	CGC-451	19,73	.777	19,51-19,94	.768-.785	CGT24-777-D*	92,05	3.624	88,90	3.500	CGC-768
11,69	.461	11,58-11,81	.456-.465	CGT14-461-D*	52,37	2.062	57,15	2.250	CGC-456	19,96	.786	19,74-20,17	.777-.794	CGT24-786-D*	92,05	3.624	88,90	3.500	CGC-777
11,82	.466	11,71-11,94	.461-.470	CGT14-466-D*	52,37	2.062	57,15	2.250	CGC-461	20,08	.795	19,96-20,40	.786-.803	CGT24-795-D*	92,05	3.624	88,90	3.500	CGC-786
11,95	.471	11,84-12,07	.466-.475	CGT14-471-D*	52,37	2.062	57,15	2.250	CGC-466	20,31	.804	20,19-20,62	.795-.812	CGT24-804-D*	92,05	3.624	88,90	3.500	CGC-795
12,07	.476	11,96-12,19	.471-.480	CGT14-476-D*	52,37	2.062	57,15	2.250	CGC-471	20,64	.813	20,40-20,88	.803-.822	CGT26-813-D*	98,40	3.874	95,25	3.750	CGC-803
12,20	.481	12,09-12,32	.476-.485	CGT14-481-D*	52,37	2.062	57,15	2.250	CGC-476	20,89	.823	20,65-21,13	.813-.832	CGT26-823-D*	98,40	3.874	95,25	3.750	CGC-813
12,33	.486	12,22-12,45	.481-.490	CGT14-486-D*	52,37	2.062	57,15	2.250	CGC-481	21,17	.834	20,93-21,41	.824-.843	CGT26-834-D*	98,40	3.874	95,25	3.750	CGC-824
12,45	.491	12,34-12,57	.486-.495	CGT14-491-D*	52,37	2.062	57,15	2.250	CGC-486	21,32	.844	21,18-21,67	.834-.853	CGT26-844-D*	98,40	3.874	95,25	3.750	CGC-834
12,58	.496	12,47-12,70	.491-.500	CGT14-496-D*	52,37	2.062	57,15	2.250	CGC-491	21,70	.855	21,46-21,95	.845-.864	CGT26-855-D*	98,40	3.874	95,25	3.750	CGC-845
12,70	.500	12,57-12,83	.495-.505	CGT16-500-D*	66,65	2.624	63,50	2.500	CGC-495	21,96	.865	21,72-22,20	.855-.874	CGT26-865-D*	98,40	3.874	95,25	3.750	CGC-855
12,83	.505	12,70-12,95	.500-.510	CGT16-505-D*	66,65	2.624	63,50	2.500	CGC-500	22,23	.875	21,97-22,48	.865-.885	CGT28-875-D*	104,75	4.124	101,60	4.000	CGC-865
12,96	.510	12,83-13,08	.505-.515	CGT16-510-D*	66,65	2.624	63,50	2.500	CGC-505	22,49	.885	22,23-22,73	.875-.895	CGT28-885-D*	104,75	4.124	101,60	4.000	CGC-875
13,08	.515	12,95-13,21	.510-.520	CGT16-515-D*	66,65	2.624	63,50	2.500	CGC-510	22,34	.895	22,48-22,99	.885-.905	CGT28-895-D*	104,75	4.124	101,60	4.000	CGC-885
13,24	.521	13,11-13,36	.516-.526	CGT16-521-D*	66,65	2.624	63,50	2.500	CGC-516	23,02	.906	22,76-23,27	.896-.916	CGT28-906-D*	104,75	4.124	101,60	4.000	CGC-896
13,36	.526	13,23-13,49	.521-.531	CGT16-526-D*	66,65	2.624	63,50	2.500	CGC-521	23,30	.917	23,04-23,55	.907-.927	CGT28-917-D*	104,75	4.124	101,60	4.000	CGC-907
13,49	.531	13,36-13,61	.526-.536	CGT16-531-D*	66,65	2.624	63,50	2.500	CGC-526	23,55	.927	23,29-23,80	.917-.937	CGT28-927-D*	104,75	4.124	101,60	4.000	CGC-917
13,62	.536	13,49-13,74	.531-.541	CGT16-536-D*	66,65	2.624	63,50	2.500	CGC-531	23,81	.937	23,55-24,05	.927-.947	CGT30-937-D*	104,75	4.124	101,60	4.000	CGC-927
13,74	.541	13,61-13,87	.536-.546	CGT16-541-D*	66,65	2.624	63,50	2.500	CGC-536	24,06	.947	23,80-24,31	.937-.957	CGT30-947-D*	104,75	4.124	101,60	4.000	CGC-937
13,87	.546	13,74-14,00	.541-.551	CGT16-546-D*	66,65	2.624	63,50	2.500	CGC-541	24,34	.958	24,08-24,59	.948-.968	CGT30-958-D*	104,75	4.124	101,60	4.000	CGC-948
14,00	.551	13,87-14,12	.546-.556	CGT16-551-D*	66,65	2.624	63,50	2.500	CGC-546	24,62	.969	24,36-24,87	.959-.979	CGT30-969-D*	104,75	4.124	101,60	4.000	CGC-959
14,13	.556	14,00-14,25	.551-.561	CGT16-556-D*	66,65	2.624	63,50	2.500	CGC-551	24,90	.980	24,64-25,15	.970-.990	CGT30-980-D*	104,75	4.124	101,60	4.000	CGC-970
14,26	.562	14,12-14,40	.556-.567	CGT18-562-D*	73,00	2.874	69,85	2.750	CGC-556	25,15	.990	24,89-25,40	.980-1.000	CGT30-990-D*	104,75	4.124	101,60	4.000	CGC-980
14,41	.568	14,27-14,55	.562-.573	CGT18-568-D*	73,00	2.874	69,85	2.750	CGC-562	25,41	1.000	25,15-25,65	.990-1.010	CGT32-1000-D*	104,75	4.124	101,60	4.000	CGC-990
14,57	.574	14,43-14,71	.568-.579	CGT18-574-D*	73,00	2.874	69,85	2.750	CGC-568	25,66	1.010	25,40-25,91	1.000-1.020	CGT32-1010-D*	104,75	4.124	101,60	4.000	CGC-1000
14,75	.581	14,61-14,88	.575-.586	CGT18-581-D*	73,00	2.874	69,85	2.750	CGC-575	25,94	1.021	25,68-26,19	1.011-1.031	CGT32-1021-D*	104,75	4.124	101,60	4.000	CGC-1011
14,90	.587	14,76-15,04	.581-.592	CGT18-587-D*	73,00	2.874	69,85	2.750	CGC-581	26,19	1.031	25,93-26,44	1.021-1.041	CGT32-1031-D*	104,75	4.124	101,60	4.000	CGC-1021
15,05	.593	14,91-15,19	.587-.598	CGT18-593-D*	73,00	2.874	69,85	2.750	CGC-587	26,45	1.041	26,19-26,70	1.031-1.051	CGT32-1041-D*	104,75	4.124	101,60	4.000	CGC-1031
15,23	.600	15,09-15,37	.594-.605	CGT18-600-D*	73,00	2.874	69,85	2.750	CGC-594	26,73	1.052	26,47-26,97	1.042-1.062	CGT32-1052-D*	104,75	4.124	101,60	4.000	CGC-1042
15,38	.606	15,24-15,52	.600-.611	CGT18-606-D*	73,00	2.874	69,85	2.750	CGC-600	26,98	1.062	26,72-27,23	1.052-1.072	CGT34-1062-D*	104,75	4.124	101,60	4.000	CGC-1052
15,53	.612	15,39-15,67	.606-.617	CGT18-612-D*	73,00	2.874	69,85	2.750	CGC-606	27,26	1.073	27,00-27,51	1.063-1.083	CGT34-1073-D*	104,75	4.124	101,60	4.000	CGC-1063
15,68	.618	15,54-15,82	.612-.623	CGT18-618-D*	73,00	2.874	69,85	2.750	CGC-612	27,54	1.084	27,28-27,79	1.074-1.094	CGT34-1084-D*	104,75	4.124	101,60	4.000	CGC-1074
15,87	.625	15,70-16,03	.618-.631	CGT20-625-D*	79,35	3.124	76,20	3.000	CGC-618	27,79	1.094	27,53-28,04	1.084-1.104	CGT34-1094-D*	104,75	4.124	101,60	4.000	CGC-1084
16,05	.632	15,88-16,21	.625-.638	CGT20-632-D*	79,35	3.124	76,20	3.000	CGC-625	28,07	1.105	27,81-28,32	1.095-1.115	CGT34-1105-D*	104,75	4.124	101,60	4.000	CGC-1095
16,22	.639	16,05-16,38	.632-.645	CGT20-639-D*	79,35	3.124	76,20	3.000	CGC-632	28,33	1.115	28,07-28,58	1.105-1.125	CGT34-1115-D*	104,75	4.124	101,60	4.000	CGC-1105
16,40	.646	16,23-16,56	.639-.652	CGT20-646-D*	79,35	3.124	76,20	3.000	CGC-639	28,58	1.125	28,32-28,83	1.115-1.135	CGT36-1125-D*	104,75	4.124	101,60	4.000	CGC-1115
16,58	.658	16,41-16,74	.646-.659	CGT20-653-D*	79,35	3.124	76,20	3.000	CGC-646	28,74	1.135	28,58-29,08	1.125-1.145	CGT36-1135-D*	104,75	4.124	101,60	4.000	CGC-1125
16,76	.660	16,59-16,92	.653-.666	CGT20-660-D*	79,35	3.124	76,20	3.000	CGC-653	29,11	1.146	28,85-29,36	1.136-1.156	CGT36-1146-D*	104,75	4.124	101,60	4.000	CGC-1136
16,93	.667	16,76-17,09	.660-.673	CGT20-667-D*	79,35	3.124	76,20	3.000	CGC-660	29,39	1.157	29,13-29,64	1.147-1.167	CGT36-1157-D*	104,75	4.124	101,60	4.000	CGC-1147
17,11	.674	16,94-17,27	.667-.680	CGT20-674-D*	79,35	3.124	76,20	3.000	CGC-667	29,65	1.167	29,39-29,90	1.157-1.177	CGT36-1167-D*	104,75	4.124	101,60	4.000	CGC-1157
17,29	.681	17,12-17-																	

HPH

High-Precision Helix Single Stroke Honing® Tools

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MBB, & LBB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MPS & TUBE
HOME ABRASIVES

CUSTOM ABRASIVES
& TOOLING

INTRODUCTION

The Single Stroke Honing® process is a fast and accurate method of sizing certain bores to final size. With the high-precision helix tool, the efficient process is now available for high production applications. Sunnen's high-production helix tools incorporate an expandable, superabrasive sleeve mounted on a tapered mandrel for precision bore sizing and finishing.

The mandrels and pilots of Sunnen's high-precision helix, Single Stroke Honing® tools are designed for maximum accuracy and fast cycle times. Sunnen stocks a wide variety of high-precision helix tools, ready to ship, for most applications.

It should be pointed out that the Single Stroke Honing® process is limited with respect to the types and volumes of material that can be removed. The size and volume of chips removed must be no more than there is clearance for between the diamond grits on the sleeve. Therefore, the Single Stroke Honing® process is best suited for honing operations that produce a relatively low volume of chips, such as interrupted or short bores, and is most successful in honing cast iron and powdered metals.

HONING HINTS – SELECTION HINTS

Although actual stock removal capability of the grit sizes offered will vary with your particular application, the following table is offered as a starting point. It lists the abrasive grits and the stock removal range found useful on various applications of the Sunnen Single Stroke Honing® Tools in the past.

GRIT SIZE	STOCK REMOVED (Cast Iron)	
D1	.001 - .003 in.	(0,03 - 0,13 mm)
D3	.0005 - .002 in.	(0,01 - 0,05 mm)
D5	.0001 - .001 in.	(0,003 - 0,03 mm)

SURFACE FINISH

The surface finish produced by a particular grit is affected by many variables, such as type of material, material hardness, and tool sharpness. The following table is offered as a guide:

Grit Size	Honing Soft Material		Honing Hard Material	
	Micrometer R_a	Microinch R_a	Micrometer R_a	Microinch R_a
D1	2,29 - 3,56	90 - 140	0,51 - 1,52	20 - 60
D3	1,14 - 2,41	45 - 95	0,25 - 0,64	10 - 25
D5	0,71 - 1,07	28 - 42	0,20 - 0,41	8 - 16

1. Either the part to be honed or the tool itself must be allowed to float.
2. A continuous flow of Sunnen Industrial Honing Oil or Coolant must be provided during the honing operation to flush the chips out of the bore.
3. Honing Speed can vary from 50 to 300 surface feet per minute, based on your particular application and honing process.
4. Feed Rate can vary from 5 to 200 inches per minute, based on your particular application and honing process.
5. Stock Removal should be consistent with the grit size of the sleeve and the surface finish requirements of the bore, based on your particular application and honing process.

TOOL DIMENSIONS

The Sunnen High-Precision Helix Single Stroke Honing® Tools are recommended for use in selected materials, where speed and accuracy are important.

To aid you in adapting your machine(s) for use of the Sunnen Single Stroke Honing® Tool, the following Tool Dimensions Table is provided. Mandrel dimensions may be altered using common metal cutting tools.

HOW TO ORDER

To avoid errors use the Part Numbers and Descriptions given in the Selection Guide.

EXAMPLE

Starting Diameter: .501 in. (12,73 mm)
Finish Diameter: .502 in. (12,75 mm)
Material: Cast Iron
Surface Finish Req: 32 μ in Ra (0,8 μ m Ra)

- A.** Using the tool dimension table, on the following pages to locate the diameter range under which the tool you need will fall.

NOTE: In this example the tool falls into the .499 - .502 in (12,68 - 12,75 mm) diameter range.

- B.** To purchase individual components, use the selection guide on the following pages depending on the style mandrel - flat or round - you need. Move horizontally across the table and select the proper Abrasive Sleeve, Pilot, Pilot Foot and Mandrel (items 1 -4).

NOTE: In this example, we will order all components for a complete tool:

- Item 1 - **Abrasive Sleeve** 6HPH500D5
(We chose D5 - 220 grit)
Item 2 - **Pilot** 6HPH500P
Item 3 - **Pilot Foot** 6HPH500F
Item 4 - **Mandrel** 6HPHD7MR (round chucking shank)

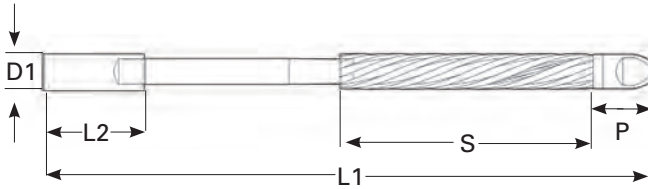
NOTE: If a flat on the mandrel is required (item 4) you would order 6HPHD7MRR9X as shown on page 3.7.

- C.** When entering the order for parts:

1. Use the Item Name used under the Number Columns Headings in the Selection Guide on the following pages. (Items 1-4 used in step B above).
2. Use the Item Numbers listed under those Columns.

HPH

High-Precision Helix Single Stroke Honing® Tools

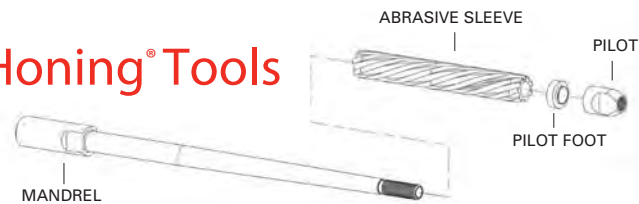


FINISHED DIAMETER TOOL RANGE		L1		L2		D1		S		P	
mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
6,325 - 6,401	.249 - .252	269,9	10.63	66,68	2.625	9,525	0.375	76,2	3	34,925	1.375
6,985 - 7,061	.275 - .278	269,9	10.63	66,68	2.625	9,525	0.375	76,2	3	34,925	1.375
7,912 - 7,988	.3115 - .3145	269,9	10.63	66,68	2.625	9,525	0.375	76,2	3	34,925	1.375
7,976 - 8,052	.314 - .317	269,9	10.63	66,68	2.625	9,525	0.375	76,2	3	34,925	1.375
9,500 - 9,576	.374 - .377	269,9	10.63	66,68	2.625	12,7	0.5	76,2	3	28,575	1.375
9,982 - 10,058	.393 - .396	269,9	10.63	66,68	2.625	12,7	0.5	76,2	3	28,575	1.125
11,100 - 11,176	.437 - .440	269,9	10.63	66,68	2.625	12,7	0.5	76,2	3	28,575	1.125
11,963 - 12,040	.471 - .474	295,3	11.63	66,68	2.625	15,875	0.625	101,6	4	28,575	1.125
12,675 - 12,751	.499 - .502	295,3	11.63	66,68	2.625	15,875	0.625	101,6	4	28,575	1.125
13,462 - 13,538	.530 - .533	295,3	11.63	66,68	2.625	19,05	0.75	101,6	4	28,575	1.125
13,970 - 14,046	.550 - .553	295,3	11.63	66,68	2.625	19,05	0.75	101,6	4	28,575	1.125
14,262 - 14,338	.5615 - .5645	295,3	11.63	66,68	2.625	19,05	0.75	101,6	4	28,575	1.125
14,973 - 15,050	.5895 - .5925	295,3	11.63	66,68	2.625	19,05	0.75	101,6	4	28,575	1.125
15,850 - 15,926	.624 - .627	295,3	11.63	66,68	2.625	19,05	0.75	101,6	4	28,575	1.125
15,977 - 16,053	.629 - .632	295,3	11.63	66,68	2.625	19,05	0.75	101,6	4	28,575	1.125
16,967 - 17,043	.668 - .671	320,7	12.63	66,68	2.625	19,05	0.75	127	5	28,575	1.125
17,437 - 17,513	.6865 - .6895	320,7	12.63	66,68	2.625	19,05	0.75	127	5	28,575	1.125
17,971 - 18,047	.7075 - .7105	320,7	12.63	66,68	2.625	19,05	0.75	127	5	28,575	1.125
18,974 - 19,050	.747 - .750	320,7	12.63	66,68	2.625	19,05	0.75	127	5	28,575	1.125
19,025 - 19,101	.749 - .752	320,7	12.63	66,68	2.625	19,05	0.75	127	5	28,575	1.125
19,977 - 20,053	.7865 - .7895	320,7	12.63	66,68	2.625	19,05	0.75	127	5	28,575	1.125
20,612 - 20,688	.8115 - .8145	320,7	12.63	66,68	2.625	19,05	0.75	127	5	28,575	1.125
21,971 - 22,047	.865 - .868	320,7	12.63	66,68	2.625	19,05	0.75	127	5	28,575	1.125
22,200 - 22,276	.874 - .877	320,7	12.63	66,68	2.625	19,05	0.75	127	5	28,575	1.125
23,978 - 24,054	.944 - .947	320,7	12.63	66,68	2.625	19,05	0.75	127	5	28,575	1.125
24,981 - 25,057	.9835 - .9865	320,7	12.63	66,68	2.625	19,05	0.75	127	5	28,575	1.125

Additional Diameter and Grit Size Available - Contact Customer Service.

HPH

High-Precision Helix Single Stroke Honing® Tools



Round Shank Tool Selection Guide

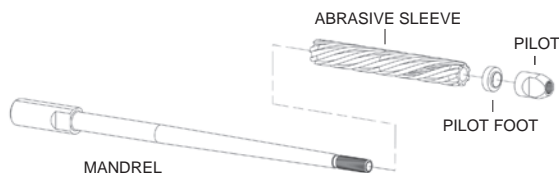
For sizes not listed, contact Sunnen Customer Service

Sunnen High-Precision Helix Single Stroke Honing® Tools Round Shank

Diameter Range 6,35 - 25,0 mm (0.250 - .984 in.)

HONING UNIT SELECTION GUIDE	Nominal Size		Finished Diameter Tool Range		1	2	3	4	5
	mm	in	mm	in	Abrasive Sleeve	Pilot	Pilot Foot	Mandrel Round Shank	Sleeve Removal Tool
PEDESTAL MACHINES (ML, EC, MBB, & LBB)	6,35	0.250	6,325 - 6,401	.249 - .252	2-HPH-250-D1-S 2-HPH-250-D3-S 2-HPH-250-D5-S	2HPH250P	2HPH250F	2HPHD7MR	2HPHRCX
	7,0	0.276	6,985 - 7,061	.275 - .278	3-HPH-276-D1-S 3-HPH-276-D3-S 3-HPH-276-D5-S	3HPH276P	3HPH276F	3HPHD7MR	3HPHRCX
PLATED TOOLING (KGM & VSS MACHINES)	7,94	0.313	7,912 - 7,988	.3115 - .3145	3-HPH-313-D1-S 3-HPH-313-D3-S 3-HPH-313-D5-S	3HPH313P	3HPH313F		
	8,0	0.315	7,976 - 8,052	.314 - .317	3-HPH-315-D1-S 3-HPH-315-D3-S 3-HPH-315-D5-S	3HPH315P	3HPH315F	4HPHD7MR	4HPHRCX
CYLINDER HONING (SV-410 & SV-10 MACHINES)	9,53	0.375	9,500 - 9,576	.374 - .377	4-HPH-375-D1-S 4-HPH-375-D3-S 4-HPH-375-D5-S	4HPH375P	4HPH375F		
	10,0	0.394	9,982 - 10,058	.393 - .396	5-HPH-394-D1-S 5-HPH-394-D3-S 5-HPH-394-D5-S	5HPH394P	5HPH394F	5HPHD7MR	5HPHRCX
PORTABLE, MPS & TUBE HOME ABRASIVES	11,1	0.438	11,100 - 11,176	.437 - .440	5-HPH-438-D1-S 5-HPH-438-D3-S 5-HPH-438-D5-S	5HPH438P	5HPH438F	5HPHD7MR	5HPHRCX
	12,0	0.472	11,963 - 12,040	.471 - .474	6-HPH-472-D1-S 6-HPH-472-D3-S 6-HPH-472-D5-S	6HPH472P	6HPH472F	6HPHD7MR	6HPHRCX
CUSTOM ABRASIVES & TOOLING	12,7	0.500	12,675 - 12,751	.499 - .502	6-HPH-500-D1-S 6-HPH-500-D3-S 6-HPH-500-D5-S	6HPH500P	6HPH500F		
	13,49	0.531	13,462 - 13,538	.530 - .533	7-HPH-531-D1-S 7-HPH-531-D3-S 7-HPH-531-D5-S	7HPH531P	7HPH531F	7HPHD7MR	7HPHRCX
	14,0	0.551	13,970 - 14,046	.550 - .553	7-HPH-551-D1-S 7-HPH-551-D3-S 7-HPH-551-D5-S	7HPH551P	7HPH551F		
	14,29	0.5625	14,262 - 14,338	.5615 - .5645	7-HPH-563-D1-S 7-HPH-563-D3-S 7-HPH-563-D5-S	7HPH563P	7HPH563F	8HPHD7MR	8HPHRCX
	15,0	0.591	14,973 - 15,050	.5895 - .5925	7-HPH-591-D1-S 7-HPH-591-D3-S 7-HPH-591-D5-S	7HPH591P	7HPH591F		
	15,88	0.625	15,850 - 15,926	.624 - .627	7-HPH-625-D1-S 7-HPH-625-D3-S 7-HPH-625-D5-S	7HPH625P	7HPH625F	9HPHD7MR	9HPHRCX
	16,0	0.630	15,977 - 16,053	.629 - .632	7-HPH-630-D1-S 7-HPH-630-D3-S 7-HPH-630-D5-S	7HPH630P	7HPH630F		
	17,0	0.669	16,967 - 17,043	.668 - .671	8-HPH-669-D1-S 8-HPH-669-D3-S 8-HPH-669-D5-S	8HPH669P	8HPH669F	10HPHD7MR	10HPHRCX
	17,46	0.6875	17,437 - 17,513	.6865 - .6895	8-HPH-688-D1-S 8-HPH-688-D3-S 8-HPH-688-D5-S	8HPH688P	8HPH688F		
	18,0	0.709	17,971 - 18,047	.7075 - .7105	8-HPH-709-D1-S 8-HPH-709-D3-S 8-HPH-709-D5-S	8HPH709P	8HPH709F	10HPHD7MR	10HPHRCX
	19,0	0.748	18,974 - 19,050	.747 - .750	8-HPH-748-D1-S 8-HPH-748-D3-S 8-HPH-748-D5-S	8HPH748P	8HPH748F		
	19,05	0.750	19,025 - 19,101	.749 - .752	8-HPH-750-D1-S 8-HPH-750-D3-S 8-HPH-750-D5-S	8HPH750P	8HPH750F	10HPHD7MR	10HPHRCX
	20,0	0.787	19,977 - 20,053	.7865 - .7895	9-HPH-788-D1-S 9-HPH-788-D3-S 9-HPH-788-D5-S	9HPH788P	9HPH788F		
	20,64	0.8125	20,612 - 20,688	.8115 - .8145	9-HPH-813-D1-S 9-HPH-813-D3-S 9-HPH-813-D5-S	9HPH813P	9HPH813F	10HPHD7MR	10HPHRCX
	22,0	0.866	21,971 - 22,047	.865 - .868	9-HPH-866-D1-S 9-HPH-866-D3-S 9-HPH-866-D5-S	9HPH866P	9HPH866F		
	22,23	0.875	22,200 - 22,276	.874 - .877	9-HPH-875-D1-S 9-HPH-875-D3-S 9-HPH-875-D5-S	9HPH875P	9HPH875F	10HPHD7MR	10HPHRCX
	24,0	0.945	23,978 - 24,054	.944 - .947	10-HPH-945-D1-S 10-HPH-945-D3-S 10-HPH-945-D5-S	10HPH945P	10HPH945F		
	25,0	0.984	24,981 - 25,057	.9835 - .9865	10-HPH-985-D1-S 10-HPH-985-D3-S 10-HPH-985-D5-S	10HPH985P	10HPH985F		

*Adapter Sleeve is necessary for use on Sunnen Multi-Spindle VSS™ systems. Additional Diameter and Grit Size Available - Contact Customer Service.



Flat Shank Tool Selection Guide

For sizes not listed, contact Sunnen Customer Service

Sunnen High-Precision Helix Single Stroke Honing® Tools Flat Shank

Diameter Range 6,35 - 25,0 mm (0.250 - .984 in.)

Nominal Size		Finished Diameter Tool Range		1	Abrasive Sleeve	2	Pilot	3	Pilot Foot	4	Mandrel Flat Shank	5	Adapter Sleeve*	6	Sleeve Removal Tool			
mm	in	mm	in															
6,35	0.250	6,325 - 6,401	.249 - .252		2-HPH-250-D1-S 2-HPH-250-D3-S 2-HPH-250-D5-S		2HPH250P		2HPH250F		2HPHD7MRRA9X	HPH23			2HPHRCX			
7,0	0.276	6,985 - 7,061	.275 - .278		3-HPH-276-D1-S 3-HPH-276-D3-S 3-HPH-276-D5-S		3HPH276P		3HPH276F	3HPHD7MRRA9X					3HPHRCX			
7,94	0.313	7,912 - 7,988	.3115 - .3145		3-HPH-313-D1-S 3-HPH-313-D3-S 3-HPH-313-D5-S		3HPH313P		3HPH313F									
8,0	0.315	7,976 - 8,052	.314 - .317		3-HPH-315-D1-S 3-HPH-315-D3-S 3-HPH-315-D5-S		3HPH315P		3HPH315F									
9,53	0.375	9,500 - 9,576	.374 - .377		4-HPH-375-D1-S 4-HPH-375-D3-S 4-HPH-375-D5-S		4HPH375P		4HPH375F		4HPHD7MRRA9X	HPH45			4HPHRCX			
10,0	0.394	9,982 - 10,058	.393 - .396		5-HPH-394-D1-S 5-HPH-394-D3-S 5-HPH-394-D5-S		5HPH394P		5HPH394F		5HPHD7MRRA9X					5HPHRCX		
11,1	0.438	11,100 - 11,176	.437 - .440		5-HPH-438-D1-S 5-HPH-438-D3-S 5-HPH-438-D5-S		5HPH438P		5HPH438F		5HPHD7MR	HPH6			5HPHRCX			
12,0	0.472	11,963 - 12,040	.471 - .474		6-HPH-472-D1-S 6-HPH-472-D3-S 6-HPH-472-D5-S		6HPH472P		6HPH472F	6HPHD7MRRA9X						6HPHRCX		
12,7	0.500	12,675 - 12,751	.499 - .502		6-HPH-500-D1-S 6-HPH-500-D3-S 6-HPH-500-D5-S		6HPH500P		6HPH500F									
13,49	0.531	13,462 - 13,538	.530 - .533		7-HPH-531-D1-S 7-HPH-531-D3-S 7-HPH-531-D5-S		7HPH531P		7HPH531F	7HPHD7MRRA9X						7HPHRCX		
14,0	0.551	13,970 - 14,046	.550 - .553		7-HPH-551-D1-S 7-HPH-551-D3-S 7-HPH-551-D5-S		7HPH551P		7HPH551F									
14,29	0.5625	14,262 - 14,338	.5615 - .5645		7-HPH-563-D1-S 7-HPH-563-D3-S 7-HPH-563-D5-S		7HPH563P		7HPH563F									
15,0	0.591	14,973 - 15,050	.5895 - .5925		7-HPH-591-D1-S 7-HPH-591-D3-S 7-HPH-591-D5-S		7HPH591P		7HPH591F									
15,88	0.625	15,850 - 15,926	.624 - .627		7-HPH-625-D1-S 7-HPH-625-D3-S 7-HPH-625-D5-S		7HPH625P		7HPH625F									
16,0	0.630	15,977 - 16,053	.629 - .632		7-HPH-630-D1-S 7-HPH-630-D3-S 7-HPH-630-D5-S		7HPH630P		7HPH630F									
17,0	0.669	16,967 - 17,043	.668 - .671		8-HPH-669-D1-S 8-HPH-669-D3-S 8-HPH-669-D5-S		8HPH669P		8HPH669F		8HPHD7MRRA9X			HPH710				8HPHRCX
17,46	0.6875	17,437 - 17,513	.6865 - .6895		8-HPH-688-D1-S 8-HPH-688-D3-S 8-HPH-688-D5-S		8HPH688P		8HPH688F									
18,0	0.709	17,971 - 18,047	.7075 - .7105		8-HPH-709-D1-S 8-HPH-709-D3-S 8-HPH-709-D5-S		8HPH709P		8HPH709F									
19,0	0.748	18,974 - 19,050	.747 - .750		8-HPH-748-D1-S 8-HPH-748-D3-S 8-HPH-748-D5-S		8HPH748P		8HPH748F									
19,05	0.750	19,025 - 19,101	.749 - .752		8-HPH-750-D1-S 8-HPH-750-D3-S 8-HPH-750-D5-S		8HPH750P		8HPH750F	9HPHD7MRRA9X								
20,0	0.787	19,977 - 20,053	.7865 - .7895		9-HPH-788-D1-S 9-HPH-788-D3-S 9-HPH-788-D5-S		9HPH788P		9HPH788F									
20,64	0.8125	20,612 - 20,688	.8115 - .8145		9-HPH-813-D1-S 9-HPH-813-D3-S 9-HPH-813-D5-S		9HPH813P		9HPH813F									
22,0	0.866	21,971 - 22,047	.865 - .868		9-HPH-866-D1-S 9-HPH-866-D3-S 9-HPH-866-D5-S		9HPH866P		9HPH866F									
22,23	0.875	22,200 - 22,276	.874 - .877		9-HPH-875-D1-S 9-HPH-875-D3-S 9-HPH-875-D5-S		9HPH875P		9HPH875F	10HPHD7MRRA9X					10HPHRCX			
24,0	0.945	23,978 - 24,054	.944 - .947		10-HPH-945-D1-S 10-HPH-945-D3-S 10-HPH-945-D5-S		10HPH945P		10HPH945F									
25,0	0.984	24,981 - 25,057	.9835 - .9865		10-HPH-985-D1-S 10-HPH-985-D3-S 10-HPH-985-D5-S		10HPH985P		10HPH985F									

*Adapter Sleeve is necessary for use on Sunnen Multi-Spindle VSS™ systems. Additional Diameter and Grit Size Available - Contact Customer Service.

www.sunnen.com

Single Stroke Honing®

A-Type Tooling and Accessories

Introduction

Single Stroke Honing®. This process is a fast and accurate method of sizing certain bores to final size. The Sunnen Single Stroke Honing® Tool used is an expandable, superabrasive sleeve mounted on a tapered arbor. The sleeve is expanded to size during setup. The rotating Single Stroke Honing® Tool is pushed through the bore only once. Only periodic expansion adjustments are necessary to compensate for tool wear after initial setup.

It should be pointed out that the Single Stroke Honing® process is limited with respect to the types and volumes of material that can be removed. The size and volume of chips removed must be no more than there is clearance for between the diamond grits on the sleeve. Therefore, the Single Stroke Honing® process is best suited for honing operations that produce a relatively low volume of chips, such as interrupted or short bores, and is most successful in honing cast iron and powdered metals.

Selection Hints

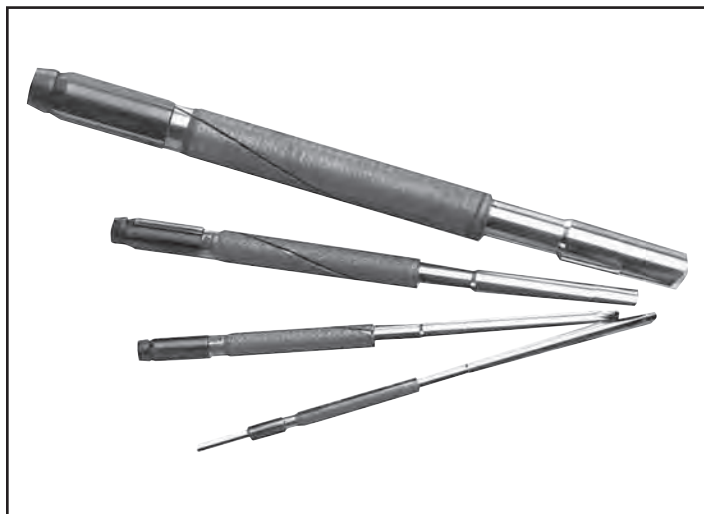
For most Single Stroke Honing® applications D5-220 grit diamond roughing sleeves, and D8-400 grit diamond finishing sleeves, are all that is required. Many of these sleeves are shipped from stock as noted by the (*) asterisk next to the sleeve's part number in the Tables on pages 3.8-3.13. Other grits are available for applications where stock removal and/or surface finish requirements indicate their need.

Although actual stock removal capability of the grit sizes offered will vary with your particular application, the following table is offered as a starting point. It lists the abrasive sleeves and the stock removal range found useful on various applications of the Sunnen Single Stroke Honing® Tools in the past.

Adapter Sleeves for AH, MHS, VSS Machines

Part Number	mm	in
A810S	5,92-9,35	.233-.368
A12S†	9,35-10,90	.368-.429
A14S†	10,90-12,47	.429-.491
A16S†	12,47-14,05	.491-.553
A18S†	14,05-15,57	.553-.613
A20S†	15,57-17,17	.613-.676
A22S†	17,17-18,31	.676-.721
A24S†	18,31-20,29	.721-.799
A26S†	20,29-21,79	.799-.858
A28S†	21,79-23,42	.858-.922
A30S†	23,42-24,92	.922-.981
A32S†	24,92-26,39	.981-1.039

†Special Order - Contact Customer Service.



Surface Finish

The surface finish produced by a particular grit is affected by many variables, such as type of material, material hardness, and tool sharpness. The following Table is offered as a guide.

Grit Size	Honing Soft Material		Honing Hard Material	
	Micrometer R _a	Microinch R _a	Micrometer R _a	Microinch R _a
D1	2,29-3,56	90-140	,51-1,52	20-60
D3	1,14-2,41	45-95	,25-.64	10-25
D5	,71-1,07	28-42	,20-.41	8-16
D7	,51-.89	20-35	,13-.36	5-14
D8	,25-.58	10-23	,08-.25	3-10
D0	,20-.46	8-18	,05-.23	2-9
D00	,15-.33	6-13	,03-.18	1-7

Grit Size	Stock Removed	
	mm	in
D1 (70 Grit Diamond)	0,03-0,13	.001-.005
D3 (100 Grit Diamond)	0,03-0,10	.001-.004
D5 (220 Grit Diamond)	0,01-0,08	.0005-.003
D7 (320 Grit Diamond)	0,01-0,06	.0005-.0025
D8* (400 Grit Diamond)	0,001-0,013	.00005-.0005
D0* (600 Grit Diamond)	0,0006-0,005	.000025-.0002
D00* (1200 Grit Diamond)	0,0006-0,0013	.000025-.00005

*Use rougher grit sleeve or sleeves first to qualify bore.

Single Stroke Honing®

A-Type Tooling Selection

Diameter Range:
5,92 mm – 12,47 mm
.233" – .491"

Note: For bore diameter sizes below 5,92 mm (.233") and above 12,47 mm (2.055"), or for special designed high production tools, consult your Sunnen Field Engineer.

Order 1-4 For A Complete Tool														
Diameter Range 5,92 mm - 12,47 mm .233" - .491"				1	2	3	4	Replacement Parts for Mandrel Assembly						
Nominal Size		Diameter Range of Tool		Abrasive Sleeve		Pilot	Mandrel Assembly	Sleeve Adjusting & Removal Tool						
mm	in	mm	in	Roughing	Finishing				Tip	Key	Regulating Screw			
6,0	0.235	5,92-6,05	0.233-0.238	A8A235-D5	A8A235-D8	A8A235P	A8AM	A810F↑	Not Applicable					
	0.240	6,05-6,17	0.238-0.243	A8A240-D5↑	A8A240-D8↑	A8A240P↑								
	0.245	6,17-6,30	0.243-0.248	A8A245-D5	A8A245-D8↑	A8A245P↑								
	0.250	6,30-6,43	0.248-0.253	A8A250-D1										
	0.250	6,30-6,43	0.248-0.253	A8A250-D3										
	0.250	6,30-6,43	0.248-0.253	A8A250-D5	A8A250-D8	A8A250P								
	0.255	6,43-6,55	0.253-0.258	A8A255-D5↑	A8A255-D8↑	A8A255P↑								
6,5	0.260	6,55-6,68	0.258-0.263	A8A260-D5	A8A260-D8↑	A8A260P↑	A8BM	A810F↑						
7,0	0.265	6,68-6,81	0.263-0.268	A8B265-D5↑	A8B265-D8↑	A8B265P↑								
	0.270	6,81-6,93	0.268-0.273	A8B270-D5↑	A8B270-D8↑	A8B270P↑								
	0.275	6,93-7,06	0.273-0.278	A8B275-D5	A8B275-D8↑	A8B275P↑								
	0.280	7,06-7,19	0.278-0.283	A8B280-D5↑	A8B280-D8↑	A8B280P↑								
	0.285	7,19-7,32	0.283-0.288	A8B285-D5↑	A8B285-D8↑	A8B285P↑								
	0.290	7,32-7,44	0.288-0.293	A8B290-D5↑	A8B290-D8↑	A8B290P↑								
7,5	0.295	7,44-7,57	0.293-0.298	A8B295-D5	A8B295-D8↑	A8B295P↑	A10AM	A810F↑						
8,0	0.300	7,57-7,70	0.298-0.303	A10A300-D5	A10A300-D8↑	A10A300P↑								
	0.305	7,70-7,82	0.303-0.308	A10A305-D5↑	A10A305-D8↑	A10A305P↑								
	0.310	7,82-7,95	0.308-0.313	A10A310-D5	A10A310-D8	A10A310P								
	0.315	7,95-8,08	0.313-0.318	A10A315-D1										
	0.315	7,95-8,08	0.313-0.318	A10A315-D3										
	0.315	7,95-8,08	0.313-0.318	A10A315-D5	A10A315-D8	A10A315P								
	0.320	8,08-8,20	0.318-0.323	A10A320-D5↑	A10A320-D8↑	A10A320P↑								
	0.325	8,20-8,33	0.323-0.328	A10A325-D5↑	A10A325-D8↑	A10A325P↑								
8,5	0.330	8,33-8,46	0.328-0.333	A10A330-D5↑	A10A330-D8↑	A10A330P↑	A10BM	A810F↑						
	0.335	8,46-8,59	0.333-0.338	A10B335-D5	A10B335-D8↑	A10B335P↑								
	0.340	8,59-8,71	0.338-0.343	A10B340-D5	A10B340-D8↑	A10B340P↑								
	0.345	8,71-8,84	0.343-0.348	A10B345-D5	A10B345-D8	A10B345P↑								
9,0	0.350	8,84-8,97	0.348-0.353	A10B350-D5↑	A10B350-D8↑	A10B350P↑	A10BM	A810F↑						
	0.355	8,97-9,09	0.353-0.358	A10B355-D5	A10B355-D8	A10B355P								
	0.360	9,09-9,22	0.358-0.363	A10B360-D5↑	A10B360-D8↑	A10B360P								
	0.365	9,22-9,35	0.363-0.368	A10B365-D5↑	A10B365-D8↑	A10B365P↑								
9,5	0.370	9,35-9,47	0.368-0.373	A12A370-D5	A12A370-D8↑	A12A370P	A12AMA	A0375-RC-X↑	A12AT	A1212K	A1212R			
	0.375	9,47-9,60	0.373-0.378	A12A375-D1										
	0.375	9,47-9,60	0.373-0.378	A12A375-D5	A12A375-D8	A12A375P								
	0.380	9,60-9,73	0.378-0.383	A12A380-D5	A12A380-D8↑	A12A380P↑								
	0.385	9,73-9,88	0.383-0.389	A12A385-D5↑	A12A385-D8↑	A12A385P↑								
10,0	0.391	9,88-10,01	0.389-0.394	A12B391-D5	A12B391-D8	A12B391P	A12BMA	A0393-RC-X↑				A12BT	A1212K	A1212R
	0.396	10,01-10,13	0.394-0.399	A12B396-D5	A12B396-D8	A12B396P								
	0.401	10,13-10,26	0.399-0.404	A12B401-D5↑	A12B401-D8↑	A12B401P↑								
	0.406	10,26-10,39	0.404-0.409	A12B406-D5↑	A12B406-D8↑	A12B406P↑								
	0.411	10,39-10,52	0.409-0.414	A12C411-D5↑	A12C411-D8↑	A12C411P↑								
10,5	0.416	10,52-10,64	0.414-0.419	A12C416-D5↑	A12C416-D8↑	A12C416P↑	A12CMA	A0416-RC-X↑				A12CT↑	A1212K	A1212R
	0.421	10,64-10,77	0.419-0.424	A12C421-D5	A12C421-D8↑	A12C421P↑								
	0.426	10,77-10,90	0.424-0.429	A12C426-D5↑	A12C426-D8	A12C426P↑								
	0.431	10,90-11,05	0.429-0.435	A14A431-D5	A14A431-D8	A14A431P↑								
11,0	0.437	11,05-11,20	0.435-0.441	A14A437-D1			A14AMA	A0437-RC-X↑	A14AT	A1414K	A1414R			
	0.437	11,05-11,20	0.435-0.441	A14A437-D5	A14A437-D8	A14A437P								
	0.443	11,20-11,38	0.441-0.448	A14A443-D5↑	A14A443-D8↑	A14A443P↑								
	0.450	11,38-11,53	0.448-0.454	A14A450-D5↑	A14A450-D8↑	A14A450P↑								
	0.456	11,53-11,68	0.454-0.460	A14B456-D5	A14B456-D8↑	A14B456P↑								
11,5	0.462	11,68-11,84	0.460-0.466	A14B462-D5↑	A14B462-D8↑	A14B462P↑	A14BMA	A0468-RC-X↑	A14BT↑	A1414K	A1414R			
	0.468	11,84-11,99	0.466-0.472	A14B468-D5	A14B468-D8↑	A14B468P↑								
	0.474	11,99-12,14	0.472-0.478	A14C474-D5	A14C474-D8	A14C474P								
12,0	0.481	12,14-12,32	0.478-0.485	A14C481-D5↑	A14C481-D8↑	A14C481P↑	A14CMA	A0481-RC-X↑	A14CT	A1414K	A1414R			
	0.487	12,32-12,47	0.485-0.491	A14C487-D5	A14C487-D8↑	A14C487P								

†Special Order - Contact Customer Service.

Single Stroke Honing®

A-Type Tooling Selection

Diameter Range:
12,47mm – 26,39mm
.491" – 1.039"

Order 1-4 For A Complete Tool

Diameter Range 12,47 mm - 26,39 mm .491" - 1.039"				1	2	3	4	Replacement Parts for Mandrel Assembly			
Nominal Size mm in		Diameter Range of Tool mm in		Abrasive Sleeve		Pilot	Mandrel Assembly	Sleeve Adjusting & Removal Tool	Tip	Key	Regulating Screw
				Roughing	Finishing						
13,0	0.493	12,47-12,65	0.491-0.498	A16A493-D5	A16A493-D8†	A16A493P†	A16AMA	A0500-RC-X†	A16AT	A1616K	A1618R
	0.500	12,65-12,83	0.498-0.505	A16A500-D5	A16A500-D8	A16A500P					
	0.507	12,83-13,00	0.505-0.512	A16A507-D5	A16A507-D8	A16A507P†					
	0.514	13,00-13,18	0.512-0.519	A16A514-D5†	A16A514-D8	A16A514P†					
14,0	0.521	13,18-13,34	0.519-0.525	A16B521-D5†	A16B521-D8†	A16B521P†	A16BMA	A0531-RC-X†	A16BT†	A1616K	A1618R
	0.527	13,34-13,51	0.525-0.532	A16B527-D5	A16B527-D8†	A16B527P†					
	0.534	13,51-13,69	0.532-0.539	A16B534-D5	A16B534-D8†	A16B534P†					
	0.541	13,69-13,87	0.539-0.546	A16B541-D5†	A16B541-D8†	A16B541P†					
	0.548	13,87-14,05	0.546-0.553	A16B548-D5	A16B548-D8	A16B548P					
14,5	0.555	14,05-14,22	0.553-0.560	A18A555-D5	A18A555-D8†	A18A555P†	A18AMA	A0562-RC-X†	A18AT†	A1818K	A1618R
	0.562	14,22-14,43	0.560-0.568	A18A562-D5	A18A562-D8	A18A562P†					
	0.570	14,43-14,61	0.568-0.575	A18A570-D5†	A18A570-D8†	A18A570P†					
	0.578	14,61-14,78	0.575-0.582	A18A578-D5†	A18A578-D8†	A18A578P†					
15,0	0.585	14,78-14,99	0.582-0.590	A18B585-D5†	A18B585-D8†	A18B585P†	A18BMA	A0594-RC-X†	A18BT†	A1818K	A1618R
	0.593	14,99-15,19	0.590-0.598	A18B593-D5	A18B593-D8	A18B593P†					
	0.601	15,19-15,37	0.598-0.605	A18B601-D5†	A18B601-D8†	A18B601P†					
	0.608	15,37-15,57	0.605-0.613	A18B608-D5	A18B608-D8†	A18B608P†					
16,0	0.616	15,57-15,80	0.613-0.622	A20A616-D5†	A20A616-D8†	A20A616P†	A20AMA	A0625-RC-X†	A20AT	A2022K	A2020R
	0.625	15,80-16,03	0.622-0.631	A20A625-D5	A20A625-D8	A20A625P					
	0.634	16,03-16,26	0.631-0.640	A20A634-D5†	A20A634-D8†	A20A634P†					
	0.643	16,26-16,48	0.640-0.649	A20A643-D5†	A20A643-D8†	A20A643P†					
17,0	0.652	16,48-16,71	0.649-0.658	A20B652-D5	A20B652-D8†	A20B652P†	A20BMA	A0661-RC-X†	A20BT†	A2022K	A2020R
	0.661	16,71-16,94	0.658-0.667	A20B661-D5†	A20B661-D8†	A20B661P†					
	0.670	16,94-17,17	0.667-0.676	A20B670-D5	A20B670-D8†	A20B670P†					
	0.679	17,17-17,40	0.676-0.685	A22A679-D5†	A22A679-D8†	A22A679P†					
18,0	0.687	17,40-17,63	0.685-0.694	A22A687-D5	A22A687-D8†	A22A687P†	A22AMA	A0687-RC-X†	A22AT†	A2022K	A2222R
	0.697	17,63-17,86	0.694-0.703	A22A697-D5†	A22A697-D8†	A22A697P†					
	0.706	17,86-18,08	0.703-0.712	A22A706-D5	A22A706-D8	A22A706P†					
	0.715	18,08-18,31	0.712-0.721	A22A715-D5†	A22A715-D8†	A22A715P†					
18,5	0.724	18,31-18,57	0.721-0.731	A24A724-D5†	A24A724-D8†	A24A724P†	A24AMA	A0734-RC-X†	A24AT†	A2426K	A2428R
	0.734	18,57-18,82	0.731-0.741	A24A734-D5	A24A734-D8†	A24A734P†					
19,0	0.743	18,82-18,97	0.741-0.747	A24B743-D5†	A24B743-D8†	A24B743P†	A24BMA	A0750-RC-X†	A24BT	A2426K	A2428R
	0.750	18,97-19,23	0.747-0.757	A24B750-D3							
	0.750	18,97-19,23	0.747-0.757	A24B750-D5	A24B750-D8	A24B750P					
	0.760	19,23-19,51	0.757-0.768	A24B760-D5†	A24B760-D8†	A24B760P†					
	0.771	19,51-19,76	0.768-0.778	A24B771-D5†	A24B771-D8†	A24B771P†					
20,0	0.781	19,76-20,04	0.778-0.789	A24C781-D5†	A24C781-D8	A24C781P†	A24CMA	A0787-RC-X†	A24CT†	A2426K	A2428R
	0.792	20,04-20,29	0.789-0.799	A24C792-D5†	A24C792-D8†	A24C792P†					
21,0	0.802	20,29-20,55	0.799-0.809	A26A802-D5†	A26A802-D8†	A26A802P†	A26AMA	A0812-RC-X†	A26AT†	A2426K	A2428R
	0.812	20,55-20,80	0.809-0.819	A26A812-D5	A26A812-D8†	A26A812P†					
	0.822	20,80-21,06	0.819-0.829	A26A822-D5†	A26A822-D8†	A26A822P†					
	0.832	21,06-21,31	0.829-0.839	A26A832-D5†	A26A832-D8†	A26A832P†					
21,5	0.842	21,31-21,56	0.839-0.849	A26B842-D5†	A26B842-D8†	A26B842P†	A26BMA	A0852-RC-X†	A26BT†	A2832K	A2428R
	0.852	21,56-21,79	0.849-0.858	A26B852-D5	A26B852-D8†	A26B852P†					
22,0	0.862	21,79-22,12	0.858-0.871	A28A862-D5	A28A862-D8	A28A862P†	A28AMA	A0875-RC-X†	A28AT	A2832K	A2428R
	0.875	22,12-22,45	0.871-0.884	A28A875-D5	A28A875-D8	A28A875P†					
	0.888	22,45-22,76	0.884-0.896	A28A888-D5†	A28A888-D8†	A28A888P†					
23,0	0.900	22,76-23,09	0.896-0.909	A28A900-D5†	A28A900-D8†	A28A900P†	A28AMA	A0875-RC-X†	A28AT†	A2832K	A2428R
	0.913	23,09-23,42	0.909-0.922	A28A913-D5†	A28A913-D8†	A28A913P†					
24,0	0.926	23,42-23,70	0.922-0.933	A30A926-D5	A30A926-D8	A30A926P†	A30AMA	A0937-RC-X†	A30AT	A2832K	A3032A†
	0.937	23,70-24,00	0.933-0.945	A30A937-D5	A30A937-D8†	A30A937P†					
	0.949	24,00-24,31	0.945-0.957	A30A949-D5	A30A949-D8†	A30A949P†					
	0.961	24,31-24,61	0.957-0.969	A30A961-D5†	A30A961-D8†	A30A961P†					
	0.973	24,61-24,92	0.969-0.981	A30A973-D5†	A30A973-D8†	A30A973P†					
25,0	0.986	24,92-25,27	0.981-0.995	A32A986-D5	A32A986-D8	A32A986P†					
26,0	1.000	25,27-25,65	0.995-1.010	A32A1000-D5	A32A1000-D8†	A32A1000P†	A32AMA	A1000-RC-X†	A32AT†	A2832K	A3032A†
	1.015	25,65-26,01	1.010-1.024	A32A1015-D5†	A32A1015-D8†	A32A1015P†					
	1.029	26,01-26,39	1.024-1.039	A32A1029-D5†	A32A1029-D8†	A32A1029P†					

†Special Order - Contact Customer Service.

Single Stroke Honing®

Non-Standard A-Type Tooling Selection

Diameter Range:
26,39 mm – 37,64 mm
1.039" – 1.482"

Order 1-4 For A Complete Tool††

Diameter Range Non-Standard 3,78 mm - 5,84 mm and 26,39 mm - 37,64 mm .149" - .233" and 1.039" - 1.482"				1	2	3	4	Replacement Parts for Mandrel Assembly			
Nominal Size		Diameter Range of Tool		Abrasive+ Sleeve	Pilot	Mandrel* Assembly	Removal Tool	Body	Tip	Key	Regulating Screw
mm	in	mm	in								
27,0	1.044	26,39-26,77	1.039-1.054	LH9X-_-1044S	LH9X-1044P	LH9X-_-1062AMA††	A1062-RC-X	LH9X-_-1062AM	LH9X-1062T	LH9X-1062K	A3032R
	1.059	26,77-27,15	1.054-1.069	LH9X-_-1059S	LH9X-1059P						
	1.074	27,15-27,53	1.069-1.084	LH9X-_-1074S	LH9X-1074P						
	1.089	27,53-27,91	1.084-1.099	LH9X-_-1089S	LH9X-1089P						
28,0	1.104	27,91-28,30	1.099-1.114	LH9X-_-1104S	LH9X-1104P	LH9X-_-1125AMA††	A1125-RC-X	LH9X-_-1125AM	LH9X-1125T	LH9X-1062K	LH9X-1125R
	1.119	28,30-28,68	1.114-1.129	LH9X-_-1119S	LH9X-1119P						
	1.134	28,68-29,06	1.129-1.144	LH9X-_-1134S	LH9X-1134P						
29,0	1.147	29,06-29,39	1.142-1.157	LH9X-_-1147S	LH9X-1147P	LH9X-_-1125AMA††	A1125-RC-X	LH9X-_-1125AM	LH9X-1125T	LH9X-1062K	LH9X-1125R
	1.158	29,39-29,67	1.153-1.168	LH9X-_-1158S	LH9X-1158P						
30,0	1.171	29,62-30,00	1.166-1.181	LH9X-_-1171S	LH9X-1171P	LH9X-_-1188AMA	A1188-RC-X	LH9X-_-1188AM	LH9X-1188T	LH9X-1062K	LH9X-1125R
	1.186	30,00-30,38	1.181-1.196	LH9X-_-1186S	LH9X-1186P						
	1.201	30,38-30,76	1.196-1.211	LH9X-_-1201S	LH9X-1201P						
	1.216	30,76-31,14	1.211-1.226	LH9X-_-1216S	LH9X-1216P						
31,0	1.231	31,14-31,52	1.226-1.241	LH9X-_-1231S	LH9X-1231P	LH9X-_-1250AMA	A1250-RC-X	LH9X-_-1250AM	LH9X-1250T	LH9X-1062K	LH9X-1125R
	1.246	31,52-31,90	1.241-1.256	LH9X-_-1246S	LH9X-1246P						
32,0	1.261	31,90-32,28	1.256-1.271	LH9X-_-1261S	LH9X-1261P	LH9X-_-1250AMA	A1250-RC-X	LH9X-_-1250AM	LH9X-1250T	LH9X-1062K	LH9X-1125R
	1.276	32,28-32,66	1.271-1.286	LH9X-_-1276S	LH9X-1276P						
33,0	1.291	32,66-33,05	1.286-1.301	LH9X-_-1291S	LH9X-1291P	LH9X-_-1312AMA	A1312-RC-X	LH9X-_-1312AM	LH9X-1312T	LH9X-1062K	LH9X-1312R
	1.306	33,05-33,43	1.301-1.316	LH9X-_-1306S	LH9X-1306P						
	1.319	33,38-33,76	1.314-1.329	LH9X-_-1319S	LH9X-1319P						
	1.334	33,76-34,14	1.329-1.344	LH9X-_-1334S	LH9X-1334P						
	1.347	34,09-34,47	1.342-1.357	LH9X-_-1347S	LH9X-1347P						
35,0	1.362	34,47-34,85	1.357-1.372	LH9X-_-1362S	LH9X-1362P	LH9X-_-1375AMA	A1375-RC-X	LH9X-_-1375AM	LH9X-1375T	LH9X-1062K	LH9X-1312R
	1.377	34,85-35,23	1.372-1.387	LH9X-_-1377S	LH9X-1377P						
	1.388	35,13-35,51	1.383-1.398	LH9X-_-1388S	LH9X-1388P						
	1.403	35,51-35,89	1.398-1.413	LH9X-_-1403S	LH9X-1403P						
36,0	1.418	35,89-36,27	1.413-1.428	LH9X-_-1418S	LH9X-1418P	LH9X-_-1438AMA	A1438-RC-X	LH9X-_-1438AM	LH9X-1438T	LH9X-1062K	LH9X-1312R
	1.433	36,27-36,65	1.428-1.443	LH9X-_-1433S	LH9X-1433P						
	1.446	36,60-36,98	1.441-1.456	LH9X-_-1446S	LH9X-1446P						
37,0	1.459	36,93-37,31	1.454-1.469	LH9X-_-1459S	LH9X-1459P	LH9X-_-1438AMA	A1438-RC-X	LH9X-_-1438AM	LH9X-1438T	LH9X-1062K	LH9X-1312R
	1.472	37,26-37,64	1.467-1.482	LH9X-_-1472S	LH9X-1472P						

How to Order

Single Stroke Honing® bore sizing tools are available from 3,78 mm-5,84 mm (.149"-.233") and larger than 26,39 mm (1.039") diameters. Tooling in these size ranges is available on a special order basis requiring a 4-6 week lead time for delivery. Use the tables above to order tools in the 26,39 mm-52,2 mm (1.039"-2.055") diameter range. For 3,78 mm-5,84 mm (.149"-.233") and larger than 52,2 mm (2.055") diameter tooling contact Customer Service Department.

*When ordering LH9X mandrel assembly or mandrel body select an overall length needed from the chart below and enter the corresponding number in the ____.

-1=360,35mm (14.187") -4=512,75mm (20.187")
-2=411,15mm (16.187") -5=563,55mm (22.187")
-3=461,95mm (18.187")

Example: LH9X-3-1625AMA mandrel assembly with 461,95mm (18.187") overall length

NOTE: Overall length increased 1.86" with pilot and tip added.

† Indicate abrasive type and grit size in ____.
Example: LH9X-D5-1044S (220 Grit Diamond).
†† Requires A32S Adapter Sleeves when used on Sunnen "AH" machines.

Grit Size		Stock Removed	
		mm	in
D1	(70 Grit Diamond)	0,03-0,13	.001-.005
D3	(100 Grit Diamond)	0,03-0,10	.001-.004
D5	(220 Grit Diamond)	0,01-0,08	.0005-.003
D7	(320 Grit Diamond)	0,01-0,06	.0005-.0025
D8†	(400 Grit Diamond)	0,001-0,013	.00005-.0005
D0†	(600 Grit Diamond)	0,0006-0,005	.000025-.0002
D00†	(1200 Grit Diamond)	0,0006-0,0013	.000025-.00005

† Use rougher grit sleeve or sleeves first to qualify bore.

Single Stroke Honing®

A-Type Tooling Selection

Diameter Range Non-Standard:

37,62 mm – 51,82 mm

1.481" – 2.040"

Order 1-4 For A Complete Tool ††

Diameter Range Non-Standard 37,62 mm - 51,82 mm 1.481" - 2.040" and 1.039" - 1.482"		1		2		3		4		Replacement Parts for Mandrel Assembly			
		Abrasive† Sleeve		Pilot		Mandrel* Assembly		Removal Tool					
		Nominal Size mm in	Diameter Range of Tool mm in							Body	Tip	Key	Regulating Screw
	1.486	37,62-38,00	1.481-1.496	LH9X-_-1486S	LH9X-1486P	LH9X-_-1500AMA	A1500-RC-X	LH9X-_-1500AM	LH9X-1500T	LH9X-1500K	LH9X-1312R		
	1.501	38,00-38,38	1.496-1.511	LH9X-_-1501S	LH9X-1501P								
	1.516	38,38-38,76	1.511-1.526	LH9X-_-1516S	LH9X-1516P								
	1.531	38,76-39,14	1.526-1.541	LH9X-_-1531S	LH9X-1531P								
40,0	1.546	39,14-39,52	1.541-1.556	LH9X-_-1546S	LH9X-1546P	LH9X-_-1562AMA	A1562-RC-X	LH9X-_-1562AM	LH9X-1562T	LH9X-1500K	LH9X-1312R		
	1.561	39,52-39,90	1.556-1.571	LH9X-_-1561S	LH9X-1561P								
	1.576	39,90-40,28	1.571-1.586	LH9X-_-1576S	LH9X-1576P								
	1.591	40,28-40,67	1.586-1.601	LH9X-_-1591S	LH9X-1591P								
41,0	1.606	40,67-41,05	1.601-1.616	LH9X-_-1606S	LH9X-1606P	LH9X-_-1625AMA	A1625-RC-X	LH9X-_-1625AM	LH9X-1625T	LH9X-1500K	LH9X-1312R		
	1.621	41,05-41,43	1.616-1.631	LH9X-_-1621S	LH9X-1621P								
	1.636	41,43-41,81	1.631-1.646	LH9X-_-1636S	LH9X-1636P								
42,0	1.651	41,81-42,19	1.646-1.661	LH9X-_-1651S	LH9X-1651P	LH9X-_-1688AMA	A1688-RC-X	LH9X-_-1688AM	LH9X-1688T	LH9X-1500K	LH9X-1312R		
43,0	1.666	42,19-42,57	1.661-1.676	LH9X-_-1666S	LH9X-1666P								
	1.681	42,57-42,95	1.676-1.691	LH9X-_-1681S	LH9X-1681P								
	1.696	42,95-43,33	1.691-1.706	LH9X-_-1696S	LH9X-1696P								
	1.709	43,28-43,66	1.704-1.719	LH9X-_-1709S	LH9X-1709P								
	1.722	43,61-43,99	1.717-1.732	LH9X-_-1722S	LH9X-1722P								
44,0	1.737	43,99-44,37	1.732-1.747	LH9X-_-1737S	LH9X-1737P	LH9X-_-1750AMA	A1750-RC-X	LH9X-_-1750AM	LH9X-1750T	LH9X-1500K	LH9X-1312R		
	1.751	44,35-44,73	1.746-1.761	LH9X-_-1751S	LH9X-1751P								
	1.766	44,73-45,11	1.761-1.776	LH9X-_-1766S	LH9X-1766P								
	1.781	45,11-45,49	1.776-1.791	LH9X-_-1781S	LH9X-1781P								
46,0	1.796	45,49-45,87	1.791-1.806	LH9X-_-1796S	LH9X-1796P	LH9X-_-1812AMA	A1812-RC-X	LH9X-_-1812AM	LH9X-1812T	LH9X-1500K	LH9X-1312R		
	1.811	45,87-46,25	1.806-1.821	LH9X-_-1811S	LH9X-1811P								
	1.826	46,25-46,63	1.821-1.836	LH9X-_-1826S	LH9X-1826P								
	1.841	46,63-47,02	1.836-1.851	LH9X-_-1841S	LH9X-1841P								
47,0	1.856	47,02-47,40	1.851-1.866	LH9X-_-1856S	LH9X-1856P	LH9X-_-1875AMA	A1875-RC-X	LH9X-_-1875AM	LH9X-1875T	LH9X-1500K	LH9X-1312R		
	1.871	47,40-47,78	1.866-1.881	LH9X-_-1871S	LH9X-1871P								
48,0	1.886	47,78-48,16	1.881-1.896	LH9X-_-1886S	LH9X-1886P	LH9X-_-1875AMA	A1875-RC-X	LH9X-_-1875AM	LH9X-1875T	LH9X-1500K	LH9X-1312R		
	1.901	48,16-48,54	1.896-1.911	LH9X-_-1901S	LH9X-1901P								
49,0	1.916	48,54-48,92	1.911-1.926	LH9X-_-1916S	LH9X-1916P	LH9X-_-1938AMA	A1938-RC-X	LH9X-_-1938AM	LH9X-1938T	LH9X-1500K	LH9X-1938R		
	1.931	48,92-49,30	1.926-1.941	LH9X-_-1931S	LH9X-1931P								
	1.944	49,25-49,63	1.939-1.954	LH9X-_-1944S	LH9X-1944P								
	1.959	49,63-50,01	1.954-1.969	LH9X-_-1959S	LH9X-1959P								
50,0	1.973	50,01-50,37	1.969-1.983	LH9X-_-1973S	LH9X-1973P	LH9X-_-2000AMA	A2000-RC-X	LH9X-_-2000AM	LH9X-2000T	LH9X-1500K	LH9X-1938R		
	1.988	50,37-50,75	1.983-1.998	LH9X-_-1988S	LH9X-1988P								
51,0	2.000	50,75-51,05	1.998-2.010	LH9X-_-2000S	LH9X-2000P								
	2.015	51,05-51,44	2.010-2.025	LH9X-_-2015S	LH9X-2015P								
	2.030	51,44-51,82	2.025-2.040	LH9X-_-2030S	LH9X-2030P								
52,0	2.045	51,82-2,20	2.040-2.055	LH9X-_-2045S	LH9X-2045P								

Note: For bore diameter sizes below 5,92 mm (.233") and above 52,20 mm (2.055"), or for special designed tools, contact Customer Service.

*When ordering LH9X mandrel assembly or mandrel body select an overall length needed from the chart below and enter the corresponding number in the ____.

**LH9X tools are special order item.
Contact Customer Service.**

† Indicate abrasive type and grit size in ____.
Example: LH9X-D5-1044S (220 Grit Diamond).

†† Requires A32S Adapter Sleeves when used on Sunnen "AH" machines.

Single Stroke Honing®

Tooling Selection

Tool Dimensions

The Sunnen Single Stroke Honing® Tools are recommended for use in selected materials, where speed and accuracy are important. To aid in adapting your machine(s) for use of the Sunnen Single Stroke Honing® Tool, the following Tool Dimensions Table is provided. Mandrel dimensions may be altered using common metal cutting tools.

Letters across the top of the table refer to the Lettered Dimensions on Figures A & B.

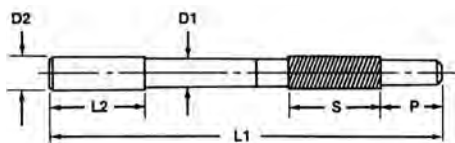


Figure A

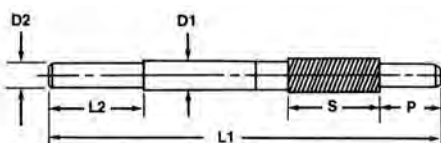


Figure B

NOTE: For bore diameter sizes below 5,92 mm (.233") and above 52,20 mm (2.055"), or for special designed high production tools, consult your Sunnen Field Engineer

Single Stroke Honing® Tool Dimensions

Diameter Range† of Tool		Series No.	Fig.	L1		L2		D1		D2		S		P	
mm	in			mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
05,92-06,68	0.233-0.263	A8A	A	230,17	09.062	34,93	1.375	05,79	0.228	07,54	0.2970	047,63	1.875	29,13	1.147
06,68-07,57	0.263-0.298	A8B	A	230,17	09.062	34,93	1.375	06,55	0.258	07,54	0.2970	047,63	1.875	29,13	1.147
07,57-08,46	0.298-0.333	A10A	A	230,17	09.062	34,93	1.375	07,44	0.293	07,54	0.2970	047,63	1.875	29,13	1.147
08,46-09,35	0.333-0.368	A10B	B	230,17	09.062	34,93	1.375	08,33	0.328	07,54	0.2970	047,63	1.875	29,13	1.147
09,35-09,88	0.368-0.389	A12A	A	304,44	11.986	54,76	2.156	09,25	0.364	09,36	0.3685	057,15	2.250	25,25	0.994
09,88-10,39	0.389-0.409	A12B	B	304,44	11.986	54,76	2.156	09,78	0.385	09,36	0.3685	057,15	2.250	25,25	0.994
10,39-10,90	0.409-0.429	A12C	B	304,44	11.986	54,76	2.156	10,29	0.405	09,36	0.3685	057,15	2.250	25,25	0.994
10,90-11,53	0.429-0.454	A14A	A	337,14	13.273	54,76	2.156	10,79	0.425	10,93	0.4305	066,68	2.625	29,41	1.158
11,53-11,99	0.454-0.472	A14B	B	337,14	13.273	54,76	2.156	11,43	0.450	10,93	0.4305	066,68	2.625	29,41	1.158
11,99-12,47	0.472-0.491	A14C	B	337,14	13.273	54,76	2.156	11,88	0.468	10,93	0.4305	066,68	2.625	29,41	1.158
12,47-13,18	0.491-0.519	A16A	A	362,97	14.187	54,76	2.156	12,36	0.487	12,53	0.4935	076,20	3.000	33,27	1.310
13,18-14,05	0.519-0.553	A16B	B	362,97	14.187	54,76	2.156	13,08	0.515	12,53	0.4935	076,20	3.000	33,27	1.310
14,05-14,78	0.553-0.582	A18A	A	399,69	15.736	54,76	2.156	13,92	0.548	14,08	0.5545	085,73	3.375	36,45	1.435
14,78-15,57	0.582-0.613	A18B	B	399,69	15.736	54,76	2.156	14,66	0.577	14,08	0.5545	085,73	3.375	36,45	1.435
15,57-16,48	0.613-0.649	A20A	A	431,67	16.995	54,76	2.156	15,47	0.609	15,68	0.6175	095,25	3.750	39,90	1.571
16,48-17,17	0.649-0.676	A20B	B	431,67	16.995	54,76	2.156	16,38	0.645	15,68	0.6175	095,25	3.750	39,90	1.571
17,17-18,31	0.676-0.721	A22A	A	463,40	18.244	54,76	2.156	17,04	0.671	17,26	0.6795	104,78	4.125	43,08	1.696
18,31-18,82	0.721-0.741	A24A	A	500,23	19.694	54,76	2.156	18,14	0.714	18,78	0.7395	114,30	4.500	49,83	1.962
18,82-19,76	0.741-0.778	A24B	A	500,23	19.694	54,76	2.156	18,64	0.734	18,78	0.7395	114,30	4.500	49,83	1.962
19,76-20,29	0.778-0.799	A24C	B	500,23	19.694	54,76	2.156	19,58	0.771	18,78	0.7395	114,30	4.500	49,83	1.962
20,29-21,31	0.799-0.839	A26A	A	531,98	20.944	54,76	2.156	20,14	0.793	20,38	0.8025	123,83	4.875	53,01	2.087
21,31-21,79	0.839-0.858	A26B	B	531,98	20.944	54,76	2.156	21,16	0.833	20,38	0.8025	123,83	4.875	53,01	2.087
21,79-23,42	0.858-0.922	A28A	A	560,55	22.069	54,76	2.156	21,64	0.852	21,96	0.8645	133,35	5.250	54,61	2.150
23,42-24,92	0.922-0.981	A30A	A	593,52	23.367	54,76	2.156	23,27	0.916	23,53	0.9265	142,88	5.625	59,06	2.325
24,92-26,39	0.981-1.039	A32A	A	625,25	24.616	54,76	2.156	24,77	0.975	25,11	0.9885	152,40	6.000	62,23	2.450
26,39-27,91	1.039-1.099	LH9X-_-1062	B	*	*	57,15	2.250	26,24	1.033	25,10	0.9885	152,40	6.000	62,23	2.450
27,91-29,67	1.099-1.168	LH9X-_-1125	B	*	*	57,15	2.250	27,76	1.093	25,10	0.9885	152,40	6.000	63,83	2.513
29,62-31,14	1.166-1.226	LH9X-_-1188	B	*	*	57,15	2.250	29,46	1.160	25,10	0.9885	152,40	6.000	63,83	2.513
31,14-32,66	1.226-1.286	LH9X-_-1250	B	*	*	57,15	2.250	30,99	1.220	25,10	0.9885	152,40	6.000	63,83	2.513
32,66-34,47	1.286-1.357	LH9X-_-1312	B	*	*	57,15	2.250	32,51	1.280	31,37	1.2350	152,40	6.000	65,41	2.575
34,47-35,89	1.357-1.413	LH9X-_-1375	B	*	*	57,15	2.250	34,32	1.351	31,37	1.2350	152,40	6.000	65,41	2.575
35,89-37,64	1.413-1.482	LH9X-_-1438	B	*	*	57,15	2.250	35,74	1.407	31,37	1.2350	152,40	6.000	65,41	2.575
37,62-39,14	1.481-1.541	LH9X-_-1500	B	*	*	57,15	2.250	37,47	1.475	31,37	1.2350	152,40	6.000	65,41	2.575
39,14-40,67	1.541-1.601	LH9X-_-1562	B	*	*	57,15	2.250	38,99	1.535	31,37	1.2350	152,40	6.000	65,41	2.575
40,67-42,19	1.601-1.661	LH9X-_-1625	B	*	*	57,15	2.250	40,51	1.595	31,37	1.2350	152,40	6.000	65,41	2.575
42,19-43,99	1.661-1.732	LH9X-_-1688	B	*	*	57,15	2.250	42,04	1.655	31,37	1.2350	152,40	6.000	65,41	2.575
43,99-45,49	1.732-1.791	LH9X-_-1750	B	*	*	57,15	2.250	43,84	1.726	31,37	1.2350	152,40	6.000	65,41	2.575
45,49-47,02	1.791-1.851	LH9X-_-1812	B	*	*	57,15	2.250	45,34	1.785	31,37	1.2350	152,40	6.000	65,41	2.575
47,02-48,54	1.851-1.911	LH9X-_-1875	B	*	*	57,15	2.250	46,86	1.845	31,37	1.2350	152,40	6.000	65,41	2.575
48,54-50,37	1.911-1.983	LH9X-_-1938	B	*	*	57,15	2.250	48,39	1.905	31,37	1.2350	152,40	6.000	67,44	2.655
50,37-52,20	1.983-2.055	LH9X-_-2000	B	*	*	57,15	2.250	50,22	1.977	31,37	1.2350	152,40	6.000	67,44	2.655

†Diameter range refers to a group (Series No.) of tools having a common mandrel.


*Refers to pages 3.11-3.13 for overall length dimensions of LH9X Single Stroke Tools.

Notes

HONING UNIT SELECTION GUIDE	
PEDESTAL MACHINES (ML, EC, MBB, & LBB)	
PLATED TOOLING (KGM & VSS MACHINES)	
CYLINDER HONING (SV-410 & SV-10 MACHINES)	
PORTABLE, MPS & TUBE HONE ABRASIVES	
CUSTOM ABRASIVES & TOOLING	

GHSS-1480/1950 Hone Head

Diameter Range:
38,10 mm – 65,53 mm {1.50 – 2.58 in.}

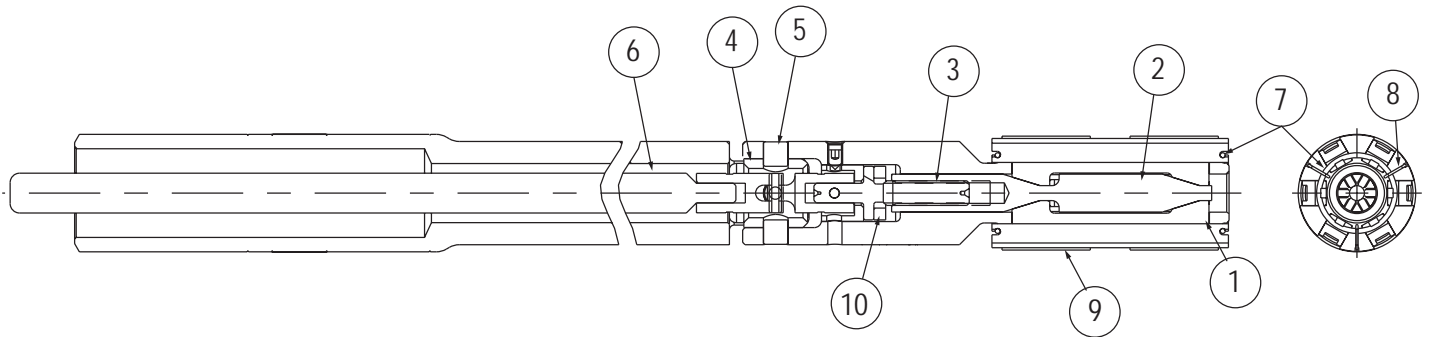
Stone Sizes					
Hone Head	Diameter Range		Stone Size Prefix (6 Stones/Set)	Abrasive Grade Suffix 	
	mm	in		Diamond (D, G, R)	CBN (N)
GHSS-1480	38,10 - 42,16	1.50 - 1.66	GH258-1-	GMG55 GMG85	NMG37
	40,13 - 44,20	1.58 - 1.74	GH258-2-		
	42,16 - 46,23	1.66 - 1.82	GH258-3-		
	44,20 - 48,01	1.74 - 1.89	GH258-4-		
	46,23 - 50,04	1.82 - 1.97	GH258-5-		
	48,26 - 52,07	1.90 - 2.05	GH258-6-		
GHSS-1950	50,04 - 57,66	1.97 - 2.27	GH258-3-	NMG05	
	54,10 - 61,47	2.13 - 2.42	GH258-5-		
	58,17 - 65,53	2.29 - 2.58	GH258-7-		

GHSS-1480/1950 Hone Head

Diameter Range:
50,04 mm – 65,53 mm {1.97 – 2.58 in.}

Brush Sets Sizes				
Hone Head	Diameter Range		Brush Set Prefix (4 Brushes/Set)	Abrasive Grade Suffix
	mm	in		
GHSS-1480	37,85 - 45,97	1.49 - 1.81	GH258-1	PHT231 (80 Grit) PHT731 (320 Grit)
	39,88 - 46,74	1.57 - 1.84	GH258-2	
	41,91 - 47,50	1.65 - 1.87	GH258-3	
	43,94 - 49,53	1.73 - 1.95	GH258-4	
	45,97 - 51,56	1.81 - 2.03	GH258-5	
	48,01 - 53,34	1.89 - 2.10	GH258-6	
GHSS-1950	49,78 - 58,93	1.96 - 2.32	GH258-3	
	53,85 - 62,99	2.12 - 2.48	GH258-5	
	57,91 - 66,80	2.28 - 2.63	GH258-7	

[‡] Other abrasive grades available - Contact Customer Service.



Common Repair Parts - GHSS-1480 / GHSS1950 (see X-GHSS-4402F for detailed repair parts)

Item No.	GHSS1480 Part No.	GHSS1950 Part No.	Qty	Description
1	G13B10616	B13B1066	1	Expander Plates (set of 6)
2	G12B354	G12B353	1	Expansion Cone
3	G17B405	G17G184	1	Expansion Screw
4	G15A175	G15A173	1	Universal Block
5	G16A210	G16A173	4	Universal Block Screw/Pin
6	G17C176	G17C177	1	Universal Joint & Rod
7	F40925	F40926	2	Retaining Spring for Stones
8	G24A127	G24A127	3	Spring Retainer
N/S	GH50	GH50	—	Spring Tool
9	—	—	6	Stone Assembly (See Charts Above)
N/S	—	F47538	1	Thrust Bearing
10	G20A189	F47537	1	Thrust Washer
N/S	GH80049	GH80049	—	Truing Grit (70 Grit)

N/S: Not Shown

GHSS

Tooling GHSS 2440/2800

GHSS-2440/2800 Hone Head

Diameter Range:

61,48 – 88,90 mm (2.46 – 3.50 in.)

GHSS-2440/2800 Hone Head

Diameter Range:

65,02 – 96,01 mm (2.56 – 3.78 in.)

Stone Sizes

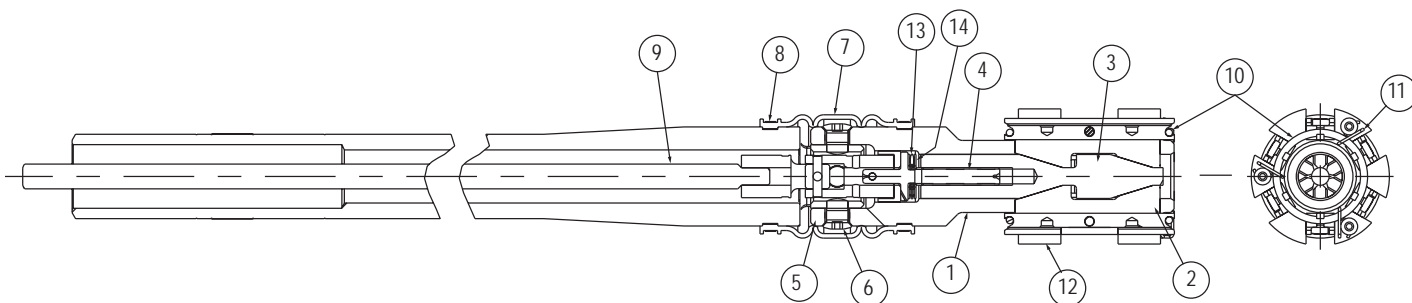
Hone Head†	Diameter Range		Stoneholder (6 Holders)	MB Superabrasive Suffix†	
	mm	in		Diamond (D, G, R)	CBN (N)
GHSS-2440(H)	61,48 – 64,26	2.46 – 2.53	G14C251-1-S6*	GH236GMG35E	GH236NMG65E
	65,79 – 67,31	2.59 – 2.65	G14C251-2-S6*	GH236GMG55E	
	68,83 – 70,36	2.71 – 2.77	G14C233-1-S6*	GH236DMB55E	
GHSS-2800(H)	71,63 – 76,45	2.82 – 3.01	G14C233-1-S6*		GH236NMG85E
	75,44 – 80,01	2.97 – 3.15	G14C233-7-S6	GH236GMG75E	
	77,98 – 82,55	3.07 – 3.25	G14C233-4-S6*	GH236GMG85E	GH236NMG05E
	80,52 – 85,09	3.17 – 3.35	G14C233-2-S6	GH236RMG95E	
	82,30 – 86,87	3.24 – 3.42	G14C233-8-S6	GH236RMG05E	GH236RMG005E
	84,33 – 88,90	3.32 – 3.50	G14C233-3-S6*		

Brush Sets Sizes

Hone Head†	Diameter Range		Brush Set Prefix (4 Brushes/Set)	Abrasive Grade Suffix
	mm	in		
GHSS-2440(H)	65,02 – 74,68	2.56 – 2.94	GH251-1-	PHT331 (120 Grit)
	68,07 – 75,95	2.68 – 2.99	GH251-2-	
	71,37 – 77,22	2.81 – 3.04	GH233-1-	
GHSS-2800(H)	73,91 – 83,31	2.91 – 3.28	GH233-1-	PHT731 (320 Grit)
	80,26 – 89,66	3.16 – 3.53	GH233-4-	
	86,61 – 96,01	3.41 – 3.78	GH233-3-	

NOTES: † GHSS-2440/2800 are kits comprised of (1) hone head & (3) Stoneholder sets (marked “*”). “H” suffix represents the hone head without stoneholder sets.

† Other abrasive grades available - Contact Customer Service.



Common Repair Parts - GHSS-2440 / GHSS2800 (see X-GHSS-4402F for detailed repair parts)

Item No.	GHSS2440 Part No.	GHSS2800 Part No.	Qty	Description
1	G11C445	G11C444	1	Body
2	G13A2836	G13A2826	1	Expander Plates (set of 6)
3	G12B348	G12B347	1	Expansion Cone
4	G17G184	G17G184	1	Expansion Screw
5	G15A173	G15A171	1	Universal Block
6	G16A203	G16A202	4	Universal Screw/Pin
7	F43937	F43936	1	Universal Joint Boot
8	F5121GH2	F5121GH2	2	Universal Joint Boot Tie Strap
9	G17G185	G17G185	1	Universal Joint & Rod
10	F5043GH2	F5042GH2	2	Retaining Spring for Stones
11	G24A126	G24A126	3	Spring Retainer
N/S	GH50	GH50	—	Spring Tool
12			6	Stoneholder (See Charts Above)
13	F47538	F47538	1	Thrust Bearing
14	F47537	F47537	2	Thrust Washer
N/S	GH80049	GH80049	—	Truing Grit (70 Grit)

N/S: Not Shown

GHSS

Tooling – GHSS 3410/4410/5410/6410

GHSS-3410/4410/5410/6410 Hone Head

Diameter Range:

87,12– 137,67 mm (3.43 – 5.42 in.)

Stone Sizes					
Hone Head†	Diameter Range		Stoneholder (6 Holders)	MB Superabrasive Suffix†	
	mm	in		Diamond (D, G, R)	CBN (N)
GHSS-3410(H)	87,12 - 91,95	3.43 - 3.62	G14C233-7-S8*	GH233GMG35E GH233GMG47E GH233GMG55E	GH233NMG57E GH233NMG65E
	89,92 - 94,49	3.54 - 3.72	G14C233-4-S8		
	93,98 - 98,55	3.70 - 3.88	G14C233-8-S8*		
	96,27 - 100,84	3.79 - 3.97	G14C233-3-S8		
	100,84 - 105,41	3.97 - 4.15	G14C233-9-S8*		
	102,62 - 107,19	4.04 - 4.22	G14C233-6-S8		
GHSS-4410(H)	107,70 - 112,27	4.24 - 4.42	G14C233-10-S8*	GH233GMG75E GH233GMG85E GH233NMG85E GH233NMG05E	GH233NMG05E
	112,52 - 117,09	4.43 - 4.61	G14C233-8-S8*		
	114,81 - 119,38	4.52 - 4.70	G14C233-3-S8		
	119,38 - 123,95	4.70 - 4.88	G14C233-9-S8*		
	121,16 - 125,73	4.77 - 4.95	G14C233-6-S8		
	126,24 - 130,81	4.97 - 5.15	G14C233-10-S8*		
GHSS-5410(H)	129,79 - 134,11	5.11 - 5.28	G14C233-16-S8	GH233RMG05E	GH233RMG005E
	133,10 - 137,67	5.24 - 5.42	G14C233-11-S8*		
GHSS-5410(H)	ranges are 25,4 mm (1.00 in) larger than the GHSS-4410 ranges				
GHSS-6410(H)	ranges are 50,8 mm (2.00 in) larger than the GHSS-4410 ranges				

GHSS-3410/4410/5410/6410 Hone Head

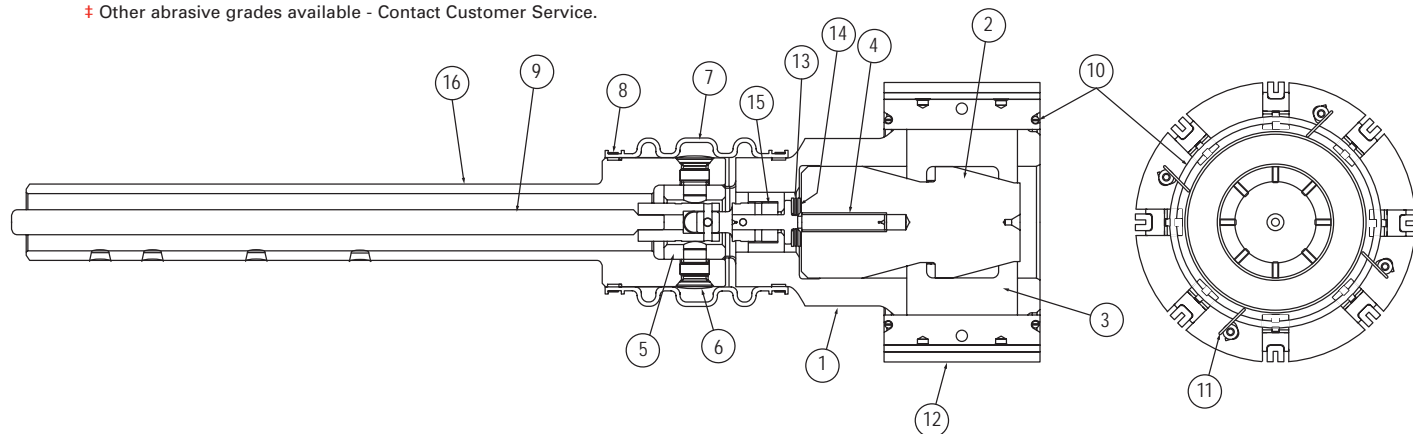
Diameter Range:

86,87– 144,78 mm (3.42 – 5.70 in.)

Brush Sets Sizes				
Hone Head†	Diameter Range		Brush Set Prefix (4 Brushes/Set)	Abrasive Grade Suffix
	mm	in		
GHSS-3410(H)	86,87 - 95,25	3.42 - 3.75	GH233-1	PHT331 (120 Grit)
	89,92 - 99,06	3.54 - 3.90	GH233-7	
	96,27 - 105,66	3.79 - 4.16	GH233-8	
	102,62 - 112,01	4.04 - 4.41	GH233-9	
	109,22 - 118,62	4.30 - 4.67	GH233-10	
	117,09 - 26,24	4.61 - 4.97	GH233-11	
GHSS-4410(H)	112,27 - 120,14	4.42 - 4.73	GH233-4	PHT731 (320 Grit)
	114,81 - 124,21	4.52 - 4.89	GH233-8	
	121,16 - 130,30	4.77 - 5.13	GH233-9	
	127,76 - 137,16	5.03 - 5.40	GH233-10	
	135,64 - 144,78	5.34 - 5.70	GH233-11	
	GHSS-5410(H) ranges are 25,4 mm (1.00 in) larger than the GHSS-4410 ranges			
GHSS-6410(H) ranges are 50,8 mm (2.00 in) larger than the GHSS-4410 ranges				

NOTES: † GHSS-3410/4410/5410/6410 are kits comprised of (1) hone head & (4) Stoneholder sets (marked “*”). “H” suffix represents the hone head without stoneholder sets.

‡ Other abrasive grades available - Contact Customer Service.



Common Repair Parts - GHSS-3410/4410/5410/6410 (see X-GHSS-4402F for detailed repair parts)

Item No.	GHSS3410 Part No.	GHSS4410 Part No.	GHSS5410 Part No.	GHSS6410 Part No.	Qty	Description
1	G11C459	G11D320	G11G575	G11G626	1	Body
2	G13A2898	G13A2918	G13A2918	G13A2918	1	Expander Plates (set of 8)
3	G12B337	G12B337	G12G380	G12G412	1	Expansion Cone
4	G17B341	G17B341	G17B341	G17B341	1	Expansion Screw
5	G15A167	G15A167	G15A167	G15A167	1	Universal Block
6	G16A182	G16A182	G16A182	G16A182	4	Universal Block Screw/Pin
7	F43927	F43927	F43927	F43927	1	Universal Joint Boot
8	F5121GH2	F5121GH2	F5121GH2	F5121GH2	2	Universal Joint Boot Tie Strap
9	G17C159	G17C159	G17C159	G17C159	1	Universal Joint & Rod
10	F5041GH2	F5045GH2	F2075	F2075	2	Retaining Spring For Stones
11	G24A125	G24A125	G24A125	G24A125	8	Spring Retainer
N/S	GH50	GH50	GH50	GH50	—	Spring Tool
12					6	Stoneholder (See Charts Above)
13	F47530	F47530	F47530	F47530	1	Thrust Bearing
14	F47531	F47531	F47531	F47531	2	Thrust Washer
15	G20A177	G20A177	G20A177		1	Spacer
16	G18C222	G18C222	G18C222	G18C222	1	Driveshaft
N/S	GH80049	GH80049	GH80049	GH80049	—	Truing Grit (70 Grit)

N/S: Not Shown

GHTS

Tooling GHTS 2440/2800

GHTS-2440/2800 Hone Head

Diameter Range:
60,71 – 94.23 mm (2.39 – 3.71 in.)

Stone Sets

Hone Head	Diameter Range		Size Prefix	Set Qty. (4 or 6)		Abrasive Suffix†	
	mm	in				Diamond (D, G, R)	CBN (N)
GHTS-2440	60,71 - 67,06	2.39 - 2.64	GT62-	4	6	GMG35	NMG57
	64,26 - 71,12	2.53 - 2.80	GT71-	4	6	GMG55	
	69,09 - 75,95	2.72 - 2.99	GT76-	4	6	GMG57	
	73,91 - 80,52	2.91 - 3.17	GT81-	4	6	GMG75	
	78,74 - 85,34	3.10 - 3.36	GT86-	4	6	GMG85	
GHTS-2800	71,37 - 79,76	2.81 - 3.14	GT71-	4	6	RMG05	NMG05
	75,44 - 84,58	2.97 - 3.33	GT76-	4	6		
	80,26 - 89,41	3.16 - 3.52	GT81-	4	6		
	85,09 - 94,23	3.35 - 3.71	GT86-	4	6		

GHTS-2440/2800 Hone Head

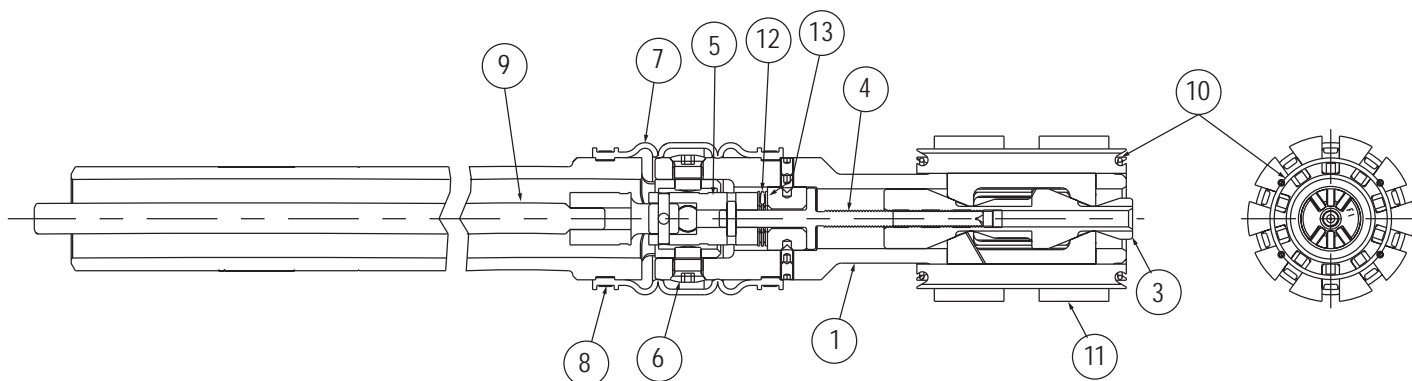
Diameter Range:
61,21 – 99,31 mm (2.41 – 3.91 in.)

Brush Sets Sizes†

Hone Head	Diameter Range		Size Prefix	Set Qty. (4 or 6)		Abrasive Suffix
	mm	in				
GHTS-2440	61,21 - 74,68	2.41 - 2.94	GT62-	4	6	PHT331 (120 Grit)
	65,02 - 76,20	2.56 - 3.00	GT71-	4	6	
	69,85 - 80,77	2.75 - 3.18	GT76-	4	6	
	74,68 - 85,60	2.94 - 3.37	GT81-	4	6	
	79,50 - 90,42	3.13 - 3.56	GT86-	4	6	
GHTS-2800	71,37 - 85,09	2.81 - 3.35	GT71-	4	6	PHT731 (320 Grit)
	76,20 - 89,66	3.00 - 3.53	GT76-	4	6	
	81,03 - 94,49	3.19 - 3.72	GT81-	4	6	
	85,85 - 99,31	3.38 - 3.91	GT86-	4	6	

NOTES: † Abrasive Stone Set Part Numbers are a Size Prefix + Set Qty. + Abrasive Suffix, e.g., GT62-6-GMG85 or GT71-4-PHT731.

‡ Other abrasive grades available - Contact Customer Service.



Common Repair Parts - GHTS-2440 / GHTS2800

Item No.	GHTS2440 Part No.	GHTS2800 Part No.	Qty	Description
1	G11C553	G11C499	1	Body
2	G13A333[]	G13A308[]	1	Expander Plates ([] = set qty of 4, 6, or 10)
3	G12C241	G12C232	1	Expansion Cone
4	G17B500	G17B436	1	Expansion Screw
5	G15A173	G15A171	1	Universal Block
6	G16A203	G16A202	4	Universal Block Screw/Pin
7	F43937	F43936	1	Universal Joint Boot
8	F5121GH2	F5121GH2	2	Universal Joint Boot Tie Strap
9	G17C212	G17C168	1	Universal Joint & Rod
10	F5127	F5127	2	Retaining Spring for Stones
N/S	GH50	GH50	—	Spring Tool
11	---	---	4 or 6	Stone Assembly (See Charts Above)
12	F47538	F47538	1	Thrust Bearing
13	F47537	F47537	2	Thrust Washer
N/S	GH80049	GH80049	—	Truing Grit (70 Grit)

N/S: Not Shown

GHTS

Tooling – GHTS 3410/4410/5410

GHTS-3410/4410/5410 Hone Head

Diameter Range:
86,87 – 140,46 mm (3.42 – 5.53 in.)

Stone Sets†

Hone Head	Diameter Range		Size Prefix	Set Qty. (6)	Abrasive Suffix	
	mm	in			Diamond (D, G, R)	CBN (N)
GHTS-3410	86,87 - 95,25	3.42 - 3.75	GH261-1-	6	GMG37 GMG57 GMG75	NMG57
	92,96 - 101,85	3.66 - 4.01	GH261-2-	6		
	99,57 - 108,46	3.92 - 4.27	GH261-3-	6		
	106,17 - 115,06	4.18 - 4.53	GH261-4-	6		
GHTS-4410	112,27 - 120,65	4.42 - 4.75	GH261-1-	6	GMG85 RMG95 RMG05 RMG005	NMG05
	118,36 - 127,25	4.66 - 5.01	GH261-2-	6		
	124,97 - 133,86	4.92 - 5.27	GH261-3-	6		
	131,57 - 140,46	5.18 - 5.53	GH261-4-	6		
GHTS-5410	ranges are 25,4 mm (1.00 in) larger than the GHTS-4410 ranges					

GHTS-3410/4410/5410 Hone Head

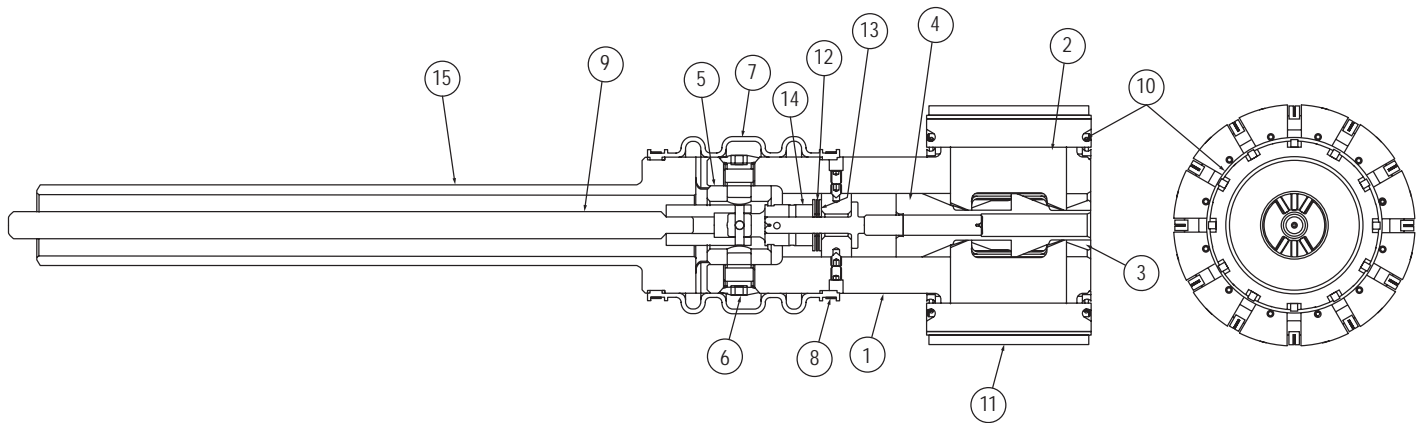
Diameter Range:
87,12 – 144,53 mm (3.43 – 5.69 in.)

Brush Sets Sizes†

Hone Head	Diameter Range		Size Prefix	Set Qty. (6)	Abrasive Suffix	
	mm	in			120 Grit	320 Grit
GHTS-3410	87,12 - 98,55	3.43 - 3.88	GH261-1	6	PHT331 (120 Grit)	
	93,98 - 105,41	3.70 - 4.15	GH261-2	6		
	100,84 - 112,27	3.97 - 4.42	GH261-3	6		
	107,70 - 119,13	4.24 - 4.69	GH261-4	6		
GHTS-4410	112,52 - 123,95	4.43 - 4.88	GH261-1	6	PHT731 (320 Grit)	
	119,38 - 130,81	4.70 - 5.15	GH261-2	6		
	126,24 - 137,67	4.97 - 5.42	GH261-3	6		
	133,10 - 144,53	5.24 - 5.69	GH261-4	6		
GHTS-5410	ranges are 25,4 mm (1.00 in) larger than the GHTS-4410 ranges					

NOTES: † Abrasive Stone Set Part Numbers are a Size Prefix + Set Qty. + Abrasive Suffix, e.g., GH261-4-GMG85 or GH261-4-PHT731.

‡ Other abrasive grades available - Contact Customer Service.



Common Repair Parts - GHTS-3410/4410/5410

Item No.	GHTS3410 Part No.	GHTS4410 Part No.	GHTS5410 Part No.	Qty	Description
1	G11C475	G11D361	G11G556	1	Body
2	G13A30212	G13A31312	G13A31312	1	Expander Plates (set of 12)
3	G12C233	G12C233	G12G373	1	Expansion Cone
4	G17B411	G17B411	G17B411	1	Expansion Screw
5	G15A167	G15A167	G15A167	1	Universal Block
6	G16A182	G16A182	G16A182	4	Universal Screw/Pin
7	F43927	F43927	F43927	1	Universal Joint Boot
8	F5121GH2	F5121GH2	F5121GH2	2	Universal Joint Boot Tie Strap
9	G17C159	G17C159	G17C159	1	Universal Joint & Rod
10	F5049GH2	F50410	F2075	2	Retaining Spring For Stones
N/S	GH50	GH50	GH50	—	Spring Tool
11	---	---	---	6	Stone Assembly (See Charts Above)
12	F47530	F47530	F47530	1	Thrust Bearing
13	F47531	F47531	F47531	2	Thrust Washer
14	G20A177	G20A177	G20A177	1	Spacer
15	G18C222	G18C222	G18C222	1	Drive Shank
N/S	GH80049	GH80049	GH80049	—	Truing Grit (70 Grit)

N/S: Not Shown

DH-Series

Diamond Honing System

Multi-Point Cutting Action for a Truly Round Bore!



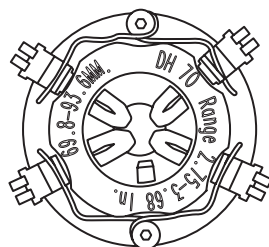
With multiple points of cutting action, Sunnen's DH Diamond Hone Head offers truly round cylinder bores – superior to any product on the market. Two designs of stones are offered - an economical one with 8 points of contact for rough boring applications or double 16 points for optimum bore tolerance.

No matter which model you chose, Sunnen's DH Hone Head uses a central drive shaft assembly. This design gives you the flexibility to change diameter ranges by simply switching the body and stone assembly. You can purchase the complete system or only the diameter range you need.

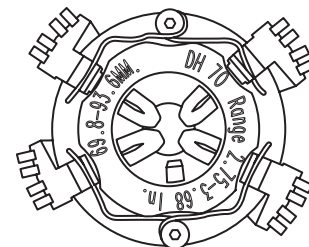
Sunnen offers the largest range of diamond hone heads in the industry - from 2.75 in. to 5.555 in. (69.9- 141.1 mm). It is versatile, as well. You can use metal bond superabrasives and PHT plateau brushes. Sunnen's DH tooling, stones and holders are made as one which reduces initial truing time. With Sunnen's precision abrasives, there is no need to flip stones ... another time saver.



4 Stone - 8 Cutting Edges

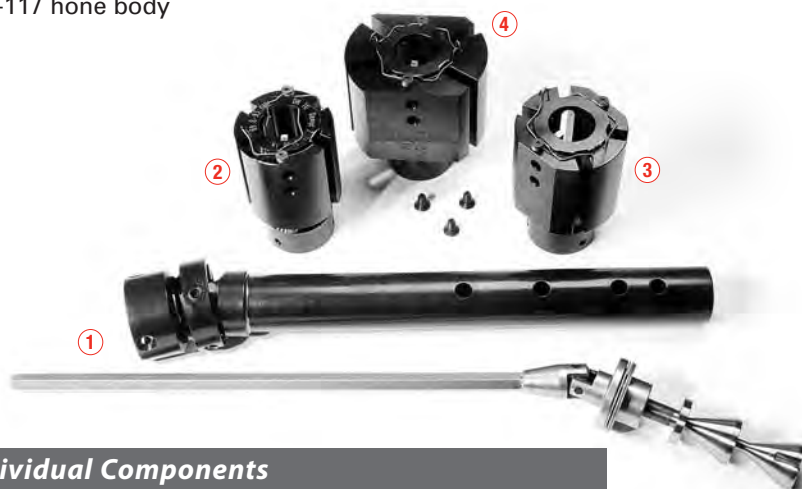


4 Stone - 16 Cutting Edges



Complete System for DHTKIT (2.75" - 5.55") Includes:

- ① DH-DA Drive shaft assembly
- ② DH-70 hone body
- ③ DH-93 hone body
- ④ DH-117 hone body



Individual Components

Part Number	Description
DH-DA	Drive shaft assembly only. Common to all hone bodies.
DHT-70	Hone body and drive shaft. Range 2.75"-3.68" (69, 85-93, 47 mm)
DHT-93	Hone body and drive shaft. Range 3.68"-4.62" (93, 47-117, 34 mm)
DHT-117	Hone body and drive shaft. Range 4.62"-5.55" (117, 34-141 mm)
DH-224	Stone retaining spring
DH-228A	Diamond dressing stick

Optional accessories for industrial use:

DH-206 (drive shaft tube) and DH-208 (feed hex rod) are available to lengthen the standard DH-DA drive assembly from 13.5" to 24.5". (Requires stone assemblies shown in table.) High Force cone and stone assembly, see next page.



DH Honing Tool

Components and Abrasives

DH Diamond Hone Head

Body	2-Stone	4-Stone	PHT Brush	Minimum		Maximum		Available Stones	Grit Size
				mm	inches	mm	inches		
DH70	DH2S-1	N/A	DH1B-1-534	69,9	2.750	77,7	3.062	—	—
DH70	DH2S-2	N/A	DH1B-2-534	77,7	3.062	85,7	3.374	NMH55	220
DH70	DH2W-3	DH4S-3	DH1B-3-534	85,7	3.374	93,6	3.686	—	—
DH93	DH2W-4	DH4S-4	DH1B-4-534	93,6	3.686	101,5	3.998	GMH45	150
DH93	DH2W-5	DH4S-5	DH1B-5-534	101,5	3.998	109,5	4.310	GMH55	220
DH93	DH2W-6	DH4S-6	DH1B-6-534	109,5	4.310	117,4	4.622	GMH75	320
DH117	DH2W-7	DH4S-7	DH1B-7-534	117,4	4.622	125,3	4.933	GMH85	400
DH117	DH2W-8	DH4S-8	DH1B-8-534	125,3	4.933	133,2	5.244	RMH95	500
DH117	DH2W-9	DH4S-9	DH1B-9-534	133,2	5.244	141	5.555	RMH05	600

Order example: DH2S-1xxx (stone #), DH2S-1NMH55

Contact Customer Service for price and availability.

DHH Diamond Hone Head

High-force Feed Cone and Stone Sets

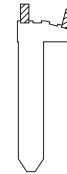
Part Number	Description
DH229	High-Force Feed Cone
DHH6	Diamond Stone Set (Range 3.680"-3.880")93, 47-98, 55 mm
DHH7	Diamond Stone Set (Range 3.880"-4.080")98, 55-103, 63 mm
DHH8	Diamond Stone Set (Range 4.080"-4.280")103, 63-108, 71 mm
DHH9	Diamond Stone Set (Range 4.280"-4.480")108, 71-113, 79 mm
DHH10	Diamond Stone Set (Range 4.480"-4.680")113, 79-118, 87 mm
DHH11	Diamond Stone Set (Range 4.680"-4.880")118, 87-123, 95 mm
DHH12	Diamond Stone Set (Range 4.880"-5.080")123, 95-129 mm
DHHB-6534	PHT Brush (Range 3.680"-3.880")93, 47-98, 55 mm
DHHB-7534	PHT Brush (Range 3.880"-4.080")98, 55-103, 63 mm
DHHB-8534	PHT Brush (Range 4.080"-4.280")103, 63-108, 71 mm
DHHB-9534	PHT Brush (Range 4.280"-4.480")108, 71-113, 79 mm
DHHB-10534	PHT Brush (Range 4.480"-4.680")113, 79-118, 87 mm
DHHB-11534	PHT Brush (Range 4.680"-4.880")118, 87-123, 95 mm
DHHB-12534	PHT Brush (Range 4.880"-5.080")123, 95-129 mm

NOTE: GMH-55, GMH-75, RMH-95 and RMH-05 abrasive grades will be set up initially.

Stone and Brush Options



DH Stone 25
25 - acceptable roundness.



DH Stone 2W
2W - good roundness, budget price



DH Stone 4S
4S- superior or optimum roundness, more expensive. 4-stone will last longer, 16 cutting edges versus 8.



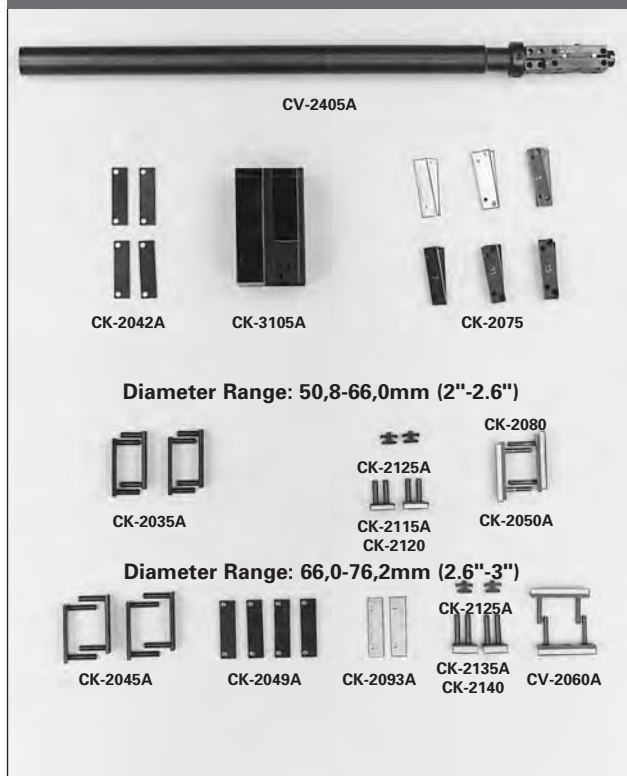
Plateau PHT - Brush Options
Plateau PHT Brush are mounted on throwaway aluminum stone holders. For the DHT-70, DHT-93 & DHT-117 hone bodies, brush assemblies 1 through 9 offer 1 PHT brush mounted on each stone holder.

CV-2400 Midget Hone Tooling Parts and Accessories



Diameter Range:
50,8 mm – 76,2 mm
2.0" – 3.0"

CV-2400 Midget Hone Unit



Part Number	Supplied with	Description
CV-2405A	1	Midget Head and Tube Assembly
CK-2035A	2 sets	Master Stoneholder Set (2 per set) 50,8-66,04 mm (2.0"-2.6") dia.
CK-2045A	2 sets	Master Stoneholder Set (2 per set) 66,04-76,2 mm (2.6"-3.0") dia.
CK-2042A	4	Stone Shim, 3,17 mm (1/8") (1 per package)
CK-2049A	2 sets	Stone Shim Set, 7,14 mm (9/32") (2 per set)
CK-2050A	2	Main and Centering Guides (Includes CK-2080)
CK-2080	—	Guide Shoe and Screw Set (2 shoes per set) (Included with CK-2050A)
CV-2060A	2	Main and Centering Guides (1 per package) (Includes CV-2070)
CV-2070	—	Guide Shoe, with Screws
CK-2093A	2	Guide Shim 4,75 mm (3/16") (1 per package)
CK-2115A	1 set	Alignment Guide Set (2 per set) 50,8-66,0 mm (2.0"-2.6") dia. (Includes CK-2120)
CK-2120	—	Alignment Guide Shoe and Screw Set (2 shoes per set)
CK-2135A	1 set	Alignment Guide Set (2 per set) 66,0-76,2 mm (2.6"-3.0") dia. (Includes CK-2140)
CK-2140	—	Alignment Guide Shoe and Screw Set (2 shoes per set)
CK-2125A	4	Clamp (1 per package)
CK-2075	1 set	Guide Shim Set, consisting of:
CK-2071A	2 sets	Guide Shim #1 (4 per set)
CK-2072A	2 sets	Guide Shim #2 (4 per set)
CK-2073A	2 sets	Guide Shim #3 (4 per set)
CK-2074A	1 set	Guide Shim #7 (4 per set)
CK-2076A	1 set	Guide Shim #11 (4 per set)
CK-2077A	1 set	Guide Shim #15 (4 per set)
CK-3105A	1	Shim Rack

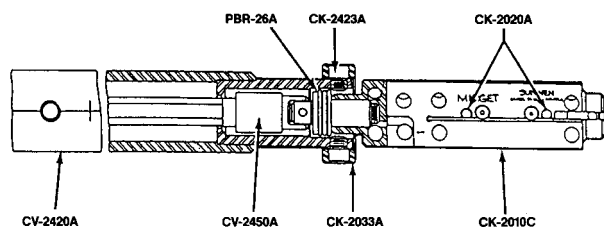
Superabrasive Stoneholders

For CV-2400 Midget Hone Head 61-76,2 mm (2.4"-3.0").
Not available for diameters less than 61 mm (2.4").
Each set consists of two Master Stoneholders that use P20 diamond or CBN stones (select stones from the P20 superabrasive selection chart on page 2.45).

CK-2035A-LF4X 61-66 mm (2.4"-2.6")

CK-2045A-LF4X 66-76,2 mm (2.6"-3.0") 2 stones required per set.
Contact Customer Service for price and availability.

Repair Parts for CV-2400 Midget Hone Head



CV-2405A Midget Hone Head

Part Number	Qty per Machine	Description
CV-2405A	1	Midget Head and Tube Assembly
CV-2420A	1	Drive Tube-Lower Half includes
CK-2033A*	1	Universal Ring with Four Screws
CK-2423A	2	Screws (5/16-24x3/16") Socket Head
PHS-698A	2	Screws (5/16-24x3/8") Socket Head (Not Shown)
CV-2450A	1	Lower Feed Rod & "U" Joint Assembly with
PBR-26A	1	Thrust Bearing (Neiman #FT-015)
CK-2010C	1	Midget Hone Head Assembly with
CK-2015A	1	Wedge Assembly (Not Shown)
CK-2020A	1	Push Pin Set (4 Pins)

*Not recommended to be purchased separately.

CV-2400 Midget Hone Tooling Parts and Accessories

Accessories

(Not included with CV-2400 Midget Hone Unit)



CK-2040A Midget Storage Rack

For orderly storage of Stoneholders and Alignment Guides. (Order separately.)



CK-3155A Setting Gage

Indicates shims required to set Guides to cylinder diameter. Also used to adjust Alignment Guides. (Order separately.)



CK-3355A Stone Inserter

Changes Stones easily in seconds. Includes mounting bracket. (Order separately.)

Replacement Parts for CK-3355A Stone Inserter:

CK-3373A Spring Retainer
CK-3372A "In/Out" Slide



CK-2570 Hard Guide Shoe

Long life for high production. (Not recommended with 400 grit or finer stone sets.)

Order **CK-2060A** for diameters 66,09-76,2 mm (2.6"-3").

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

Diameter Range: 50,8 mm – 66,04 mm {2.0" – 2.6"}

		All C20 Available Stones							
		Grit Size							
Hard---Soft		80	150	220	280	320	400	500	600
	Silicon Carbide Stones (J,C)								
				C20-A55 C20-A57 C20-J54					
					C20-J6591			C20-J85	

Diameter Range: 66,04 mm – 76,2 mm {2.6" – 3.0"}

		All C24 Available Stones							
		Grit Size							
Hard---Soft		80	150	220	280	320	400	500	600
	Silicon Carbide Stones (J,C)								
			C24-A45	C24-A55 C24-A57 C24-J54 C24-J55 C24-J57					C24-C05
	C24-J25	C24-J45			C24-J65 C24-J6591		C24-J85 C24-J87	C24-J95	

Minimum purchase quantity 6 sets.

Recommended Stones for CV-2400 Midget Hone

Operations and Materials	Most Commonly Used Stones	Approximate R _a Surface Finish	
		μm	μin
Fast removal: deburred, bored, ground or reamed holes			
Aluminum	C20/C24-J54	1,38	55
Brass, Soft	C20/C24-J54	1,38	55
Bronze	C20/C24-J54	1,38	55
Cast iron	C20/C24-J54	0,50	20
Steel, Soft	C20/C24-A57	2,00	80
Steel, Hardened	C20/C24-A55	0,45	18
Fine finishing: previously honed holes			
Aluminum	C20/C24-J95	0,30	12
Brass, Soft	C20/C24-J95	0,30	12
Bronze	C20/C24-J95	0,30	12
Cast iron	C20/C24-J95	0,10	4
Steel, Soft	C20/C24-J95	0,10	4
Steel, Hard	C20/C24-J95	0,08	3

PHT Plateau Honing Tools

Used as a final finishing step, after initial honing to provide a plateau surface on cylinder walls.

For Diameter Range		
mm	in	(320 Grit)
50,8-60,9	2.00-2.40	C20-PHT-732
58,4-73,7	2.30-2.90	C24-PHT-732

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MBB, & LBB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MP3 & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

CV-3000 Junior Hone Tooling Parts and Accessories

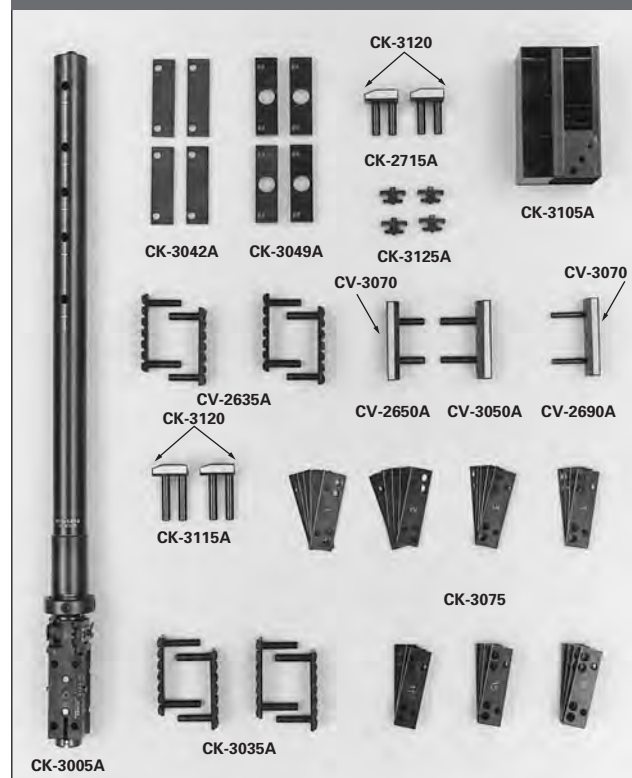


Diameter Range:

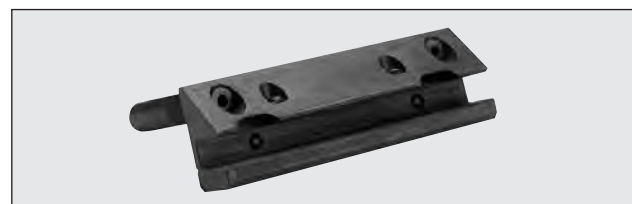
76 mm – 102 mm

3.0" – 4.0"

CV-3000 Junior Hone Unit



Part Number	Supplied with	Description
CV-3005A	1	Junior Head and Tube Assembly
CK-2635A	2 sets	Master Stoneholder Set (2 per set) 76,2-88,9 mm(3.0"-3.5") dia.
CK-3035A	2 sets	Master Stoneholder Set (2 per set) 88,9-102 mm (3.5"-4.0") dia.
CK-3042A	4	Stone Shim, 6,35 mm (1/4") (1 per package)
CK-3049A	2 sets	Stone Shim Set, 11,1 mm (7/16") (2 per set)
CV-2650A	1	Main Guide 76,2-88,9 mm (3.0"-3.5") dia. (Includes CV-3070)
CV-3050A	1	Main Guide 88,9-102 mm (3.5"-4.0") dia. (Includes CV-3070)
CV-3070	—	Guide Shoe, with Screws
CV-2690A	1	Centering Guide (Includes CV-3070)
CK-2715A	1 set	Alignment Guide Set (2 per set) 76,2-88,9 mm (3.0"-3.5") dia. (Includes CK-3120)
CK-3115A	1 set	Alignment Guide Set (2 per set) (Includes CK-3120)
CK-3120	—	Guide Shoe and Screw Set (2 shoes per set)
CK-3125A	4	Clamp (1 per package)
CK-3105A	1	Shim Rack
CK-3075	1 set	Guide Shim Set, consisting of:
CK-3071A	2 sets	Guide Shim #1 (4 per set)
CK-3072A	2 sets	Guide Shim #2 (4 per set)
CK-3073A	2 sets	Guide Shim #3 (4 per set)
CK-3074A	1 set	Guide Shim #7 (4 per set)
CK-3076A	1 set	Guide Shim #11 (4 per set)
CK-3077A	1 set	Guide Shim #15 (4 per set)
CK-3078A	1 set	Guide Shim #19 (4 per set)



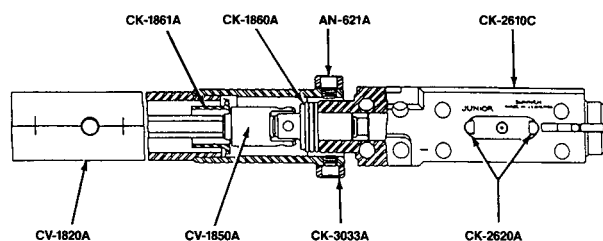
CK-3030A Superabrasive Stoneholders

For CV-3000 Junior Hone Head.

Each set consists of two Master Stoneholders that use P28 diamond or CBN stones (select stones from the P28 superabrasive selection chart on page 2.50).

Two stones required per set.

Repair Parts for CV-3000 Junior Hone Head



CV-3005A Junior Hone Head

Part Number	Qty per Machine	Description
CV-3005A	1	Junior Head and Tube Assembly
CV-1820A	1	Drive Tube-Lower Half includes
CK-3033A*	1	Universal Ring with
AN-621C	1	Screws (Package of 4) consists of
AN-621A	2	Screws (5/16-24 x 15/32") Socket Head
PHS-698A	2	Screws (5/16-24 x 3/8") Socket Head (Not Shown)
CV-1850A	1	Lower Feed Rod & "U" Joint Assembly with
CK-1861A	1	Bushing
CK-1860A	1	Thrust Bearing
CK-2610C	1	Junior Hone Head Assembly with
CK-3015A	1	Wedge Assembly (Not Shown)
CK-2620A	1	Push Pin Set (4 Pins)

*Not recommended to be purchased separately.

CV-3000 Junior Hone Tooling Parts and Accessories

Accessories

(Not included with CV-3000 Junior Hone Unit)



CK-3040A Standard Storage Rack

For orderly storage of Stoneholders and Alignment Guides. (Order separately.)



CK-3155A Setting Gage

Indicates shims required to set Guides to cylinder diameter. Also used to adjust Alignment Guides. (Order separately.)



CK-3355A Stone Inserter

Changes Stones easily in seconds. Includes mounting bracket. (Order separately.)

Replacement Parts for CK-3355A Stone Inserter:

CK-3373A Spring Retainer
CK-3372A "In/Out" Slide



CK-3570 Hard Guide Shoe

Long life for high production. (Not recommended with 400 grit or finer stone sets.)

For CK-3570 Hard Guide Shoes order:

CK-2650A Main Guide
for dia. 76,2-88,9 mm (3.0"-3.5").

CK-3050A Main Guide
for dia. 88,9-102 mm (3.5"-4.0").

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

All C30 Available Stones

		Grit Size							
		80	150	220	280	320	400	500	600
Hard---Soft	Aluminum Oxide Stones (A)								
	C30-A24 C30-A25	C30-A45 C30-A47	C30-A53 C30-A54	C30-A63 C30-A65					
			C30-A55 C30-A56						
			C30-A5681 C30-A5681A C30-A57						
Hard---Soft	Silicon Carbide Stones (J,C)								
	C30-J25	C30-J45 C30-J46	C30-J54 C30-J55 C30-J56 C30-J57	C30-J63 C30-J64 C30-J65		C30-J83 C30-J84 C30-J85 C30-J86 C30-J87	C30-J93 C30-J95	C30-C05 C30-C0381 C30-C0391	

Minimum purchase quantity 6 sets.

Recommended Stones for CV-3000 Junior Hone

Material	Stone to Use	Approximate R _a Surface Finish	
		µm	µin
Fast removal: deburred, bored, ground or reamed holes			
Aluminum	C30-J57	1,38	55
Brass, Soft	C30-J55	1,38	55
Bronze	C30-J57	1,38	55
Cast iron	C30-J57	0,50	20
Steel, Soft	C30-A25	2,00	80
Steel, Hardened	C30-A55	0,45	18
Fine finishing: previously honed holes			
Aluminum	C30-J95	0,30	12
Brass, Soft	C30-J95	0,38	15
Bronze	C30-J95	0,38	15
Cast iron	C30-J95	0,10	4
Steel, Soft	C30-J95	0,18	7
Steel, Hardened	C30-J95	0,13	5

PHT Plateau Honing Tools

Used as a final finishing step, after initial honing to provide a plateau surface on cylinder walls.

For Diameter Range		(320 Grit)
mm	in	
73,7-86,4	2.90-3.40	C30-PHT-731

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
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(SV-410 & SV-10 MACHINES)

PORTABLE, MP & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

CV-3300 Standard Hone Tooling Parts and Accessories

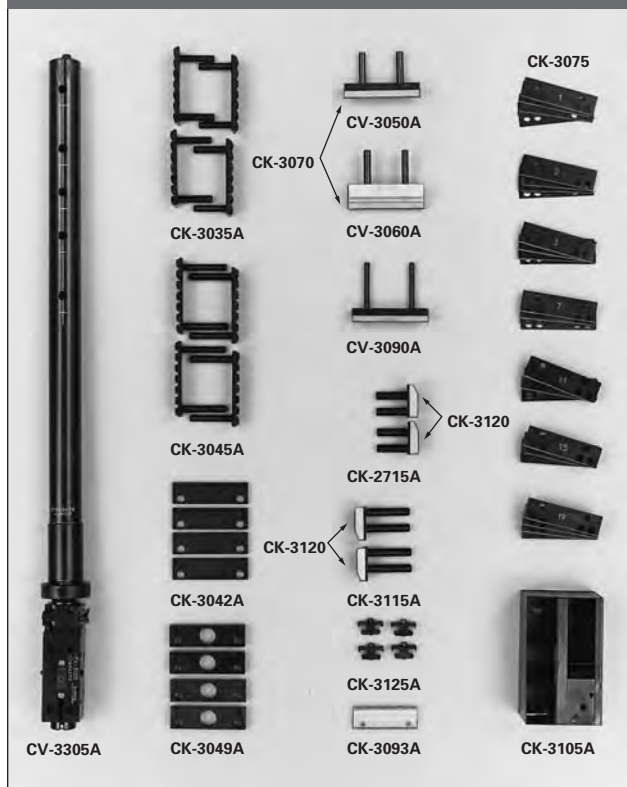


Diameter Range:

84 mm – 127 mm

3.3" – 5.0"

CV-3300 Standard Hone Unit



Part Number	Supplied with	Description
CV-3305A	1	Standard Head and Tube Assembly
CK-3035A	2 sets	Master Stoneholder Set (2 per set) 84-104,8 mm (3.300"-4.125") dia.
CK-3045A	2 sets	Master Stoneholder Set (2 per set) 104,8-127 mm (4.125"-5.000") dia.
CK-3042A	4	Stone Shim, 6,35 mm (1/4") (1 per package)
CK-3049A	2 sets	Stone Shim Set, 11,1 mm (7/16") (2 per set)
CV-3050A	1	Main Guide 84-104,8 mm (3.300"-4.125") dia. (Includes CV-3070)
CV-3060A	1	Main Guide 104,8-127 mm (4.125"-5.000") dia. (Includes CV-3070)
CV-3070	—	Guide Shoe, with Screws
CV-3090A	1	Centering Guide (Includes CV-3070)
CK-2715A	1 set	Alignment Guide Set (2 per set) 84-95,2 mm (3.300"-3.750") dia. (Includes CK-3120)
CK-3115A	1 set	Alignment Guide Set (2 per set) 95,2-127 mm (3.750"-5.000") dia. (Includes CK-3120)
CK-3120	—	Guide Shoe and Screw Set (2 shoes per set)
CK-3125A	4	Clamp (1 per package)
CK-3093A	1	Centering Guide Shim 9,5 mm (3/8")
CK-3105A	1	Shim Rack
CK-3075	1 set	Guide Shim Set, consisting of:
CK-3071A	2 sets	Guide Shim #1 (4 per set)
CK-3072A	2 sets	Guide Shim #2 (4 per set)
CK-3073A	2 sets	Guide Shim #3 (4 per set)
CK-3074A	1 set	Guide Shim #7 (4 per set)
CK-3076A	1 set	Guide Shim #11 (4 per set)
CK-3077A	1 set	Guide Shim #15 (4 per set)
CK-3078A	1 set	Guide Shim #19 (4 per set)



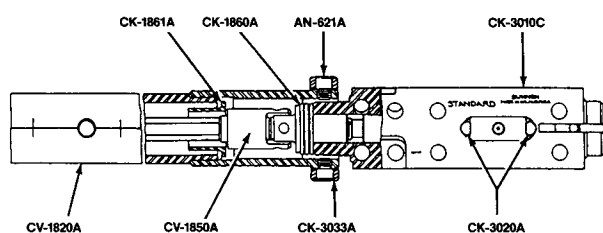
CK-3030A Superabrasive Stoneholders

(83,8mm-117,5 3.3"-4.625")

For CV-3300 Standard Hone Head. Each set consists of two Master Stoneholders that use P28 diamond or CBN stones (select stones from the P28 superabrasive selection chart on page 2.50).

Two stones required per set.

Repair Parts for CV-3300 Standard Hone Head



CV-3305A Standard Hone Head

Part Number	Qty per Machine	Description
CV-3305A	1	Standard Head and Tube Assembly
CV-1820A	1	Drive Tube-Lower Half includes
CK-3033A*	1	Universal Ring with
AN-621C	1	Screws (Package of 4) consists of
AN-621A	2	Screws (5/16-24 x 15/32") Socket Head
PHS-698A	2	Screws (5/16-24 x 3/8") Socket Head (Not Shown)
CV-1850A	1	Lower Feed Rod & "U" Joint Assembly with
CK-1861A	1	Bushing
CK-1860A	1	Thrust Bearing
CK-3010C	1	Standard Hone Head Assembly with
CK-3015A	1	Wedge Assembly (Not Shown)
CK-3020A	1	Push Pin Set (4 Pins)

CV-3300 Standard Hone Tooling Parts and Accessories

Accessories

(Not included with CV-3000 Junior Hone Unit)



CK-3040A Standard Storage Rack

For orderly storage of Stoneholders and Alignment Guides. (Order separately.)



CK-3155A Setting Gage

Indicates shims required to set Guides to cylinder diameter. Also used to adjust Alignment Guides. (Order separately.)



CK-3355A Stone Inserter

Changes Stones easily in seconds. Includes mounting bracket. (Order separately.)

Replacement Parts for CK-3355A Stone Inserter:

CK-3373A Spring Retainer
CK-3372A "In/Out" Slide



CK-3570 Hard Guide Shoe

Long life for high production. (Not recommended with 400 grit or finer stone sets.)

For CK-3570 Hard Guide Shoes order:

CK-2650A Main Guide
for dia. 84-104,8 mm (3.3"-4.125").

CK-3060A Main Guide
for dia. 104,8-127 mm (4.125"-5.0").

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

All C30 Available Stones

		Grit Size							
		80	150	220	280	320	400	500	600
Hard---Soft	Aluminum Oxide Stones (A)								
	C30-A24 C30-A25		C30-A45 C30-A47	C30-A53 C30-A54 C30-A55 C30-A56 C30-A5681 C30-A5681A C30-A57	C30-A63 C30-A65				
Hard---Soft	Silicon Carbide Stones (J,C)								
	C30-J25		C30-J45 C30-J46	C30-J54 C30-J55 C30-J56 C30-J57	C30-J63 C30-J64 C30-J65	C30-J83 C30-J84 C30-J85 C30-J86 C30-J87	C30-J93 C30-J95	C30-C05 C30-C0381 C30-C0391	

Minimum purchase quantity 6 sets.

Recommended Stones for CV-3000 Junior Hone

Material	Stone to Use	Approximate R _a Surface Finish	
		µm	µin
Fast removal: deburred, bored, ground or reamed holes			
Aluminum	C30-J57	1,38	55
Brass, Soft	C30-J55	1,38	55
Bronze	C30-J57	1,38	55
Cast iron	C30-J57	0,50	20
Steel, Soft	C30-A25	2,00	80
Steel, Hardened	C30-A55	0,45	18
Fine finishing: previously honed holes			
Aluminum	C30-J95	0,30	12
Brass, Soft	C30-J95	0,38	15
Bronze	C30-J95	0,38	15
Cast iron	C30-J95	0,10	4
Steel, Soft	C30-J95	0,18	7
Steel, Hardened	C30-J95	0,13	5

PHT Plateau Honing Tools

Used as a final finishing step, after initial honing to provide a plateau surface on cylinder walls.

For Diameter	Range	(320 Grit)
mm	in	
73,7-86,4	2.90-3.40	C30-PHT-731

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
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(SV-410 & SV-10 MACHINES)

PORTABLE, MP3 & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

CV-4000 Large Hone Tooling Parts and Accessories

Diameter Range:
102 mm – 203 mm
4.0" – 8.0"



CV-4000 Large Hone Unit (Shipped complete with items listed in Fig. 1; Fig. 2 order separately)

Figure 1 - Diameter Range: 102-152mm (4"-6")

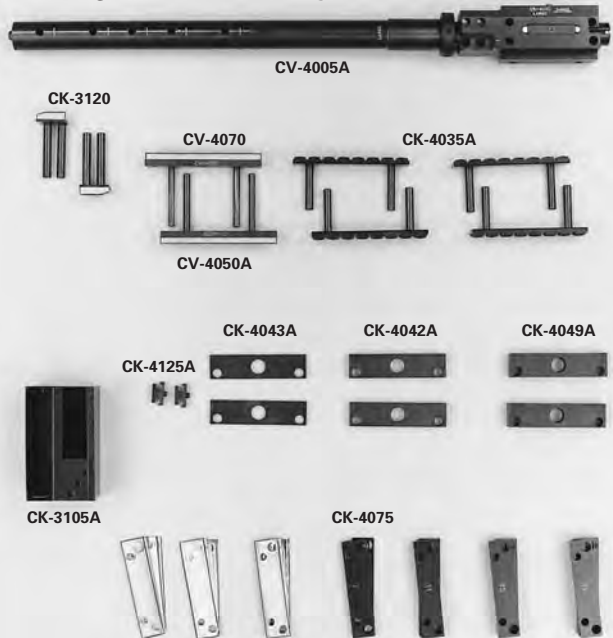


Figure 2 - Diameter Range: 152-203mm (6"-8")



Superabrasive Stoneholders

For CV-4000 Large Hone Unit.

Each set consists of two Master Stoneholders that use 2 P28 diamond or CBN stones per holder (select stones from the P28 superabrasive selection chart on page 2.50).

CK-4035A-JD7X

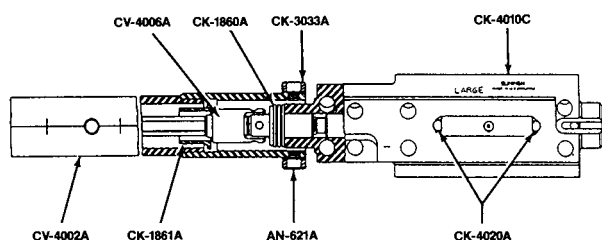
103,2-165,1 mm (4 1/16"-6.5")

CK-4045A-JD7X

154,0-215,9 mm (6 1/16"-8.5")

Part Number	Supplied with	Description
CV-4005A	1	Large Head and Tube Assembly
CK-4035A	2 sets	Master Stoneholder Set (2 per set) 102 mm-152 mm (4.0"-6.0") dia.
CV-4050A	2	Guide (Includes CV-4070) (1 per package)
CV-4070	—	Guide Shoe, with Screws
CK-4115A	1 set	Alignment Guide Set (Includes CK-3120) (2 per set)
CK-3120	—	Guide Shoe and Screw Set (2 shoes per set)
CK-4042A	2	Stone Shim 6,35 mm (.25") (1 per package)
CK-4043A	2	Stone Shim 12,7 mm (.5") (1 per package)
CK-4049A	2	Stone Shim 19,05 mm (.75") (2 per package)
CK-4125A	2	Clamp (1 per package)
CK-3105A	1	Shim Rack
CK-4075	1 set	Guide Shim Set, consisting of:
CK-4071	8 ea.	
CK-4072	8 ea.	
CK-4073	8 ea.	
CK-4074	4 ea.	
CK-4076	4 ea.	
CK-4077	4 ea.	
CK-4078	4 ea.	
Figure 2 (Not included with CV-4000)		
CK-4045A	2 sets	Master Stoneholder Sets (2 per set)
CK-4049A	2 sets	Stone Shim Set 19,05 mm (.75") (2 per set)
CK-4093A	2	Main and Centering Guide Shims (1 per package)
CK-4135A	1 set	Alignment Guide Set (Includes CK-3120) (2 per set)
CK-3120	—	Guide Shoe and Screw Set (2 per set)

Repair Parts for CV-4000 Large Hone Head



CV-4005A Large Hone Head

Part Number	Qty per Machine	Description
CV-4005A	1	Large Head and Tube Assembly
CV-4002A	1	Drive Tube-Lower Half includes
CK-3033A*	1	Universal Ring with
AN-621C	1	Screws (Package of 4) consists of
AN-621A	2	Screws (5/16-24 x 7/32") Socket Head
PHS-698A	2	Screws (5/16-24 x 3/8") Socket Head (Not Shown)
CV-4006A	1	Lower Feed Rod & "U" Joint Assembly with
CK-1861A	1	Bushing
CK-1860A	1	Thrust Bearing
CK-4010C	1	Large Hone Head Assembly with
CK-4015A	1	Wedge Assembly (Not Shown)
CK-4020A	1	Push Pin Set (4 Pins)

*Not recommended to be purchased separately.

CV-4000 Large Hone Tooling Parts and Accessories

Accessories

(Not included with CV-3000 Junior Hone Unit)



CK-4040A Standard Storage Rack

For orderly storage of Stoneholders and Alignment Guides. (Order separately.)



CK-4155A Setting Gage

Indicates shims required to set Guides to cylinder diameter. Also used to adjust Alignment Guides. (Order separately.)



CK-4355A Stone Inserter

Changes Stones easily in seconds. Includes mounting bracket. (Order separately.)

Replacement Parts for CK-4355A Stone Inserter:

CK-4373A Spring Retainer
CK-4372A "In/Out" Slide



CK-4570 Hard Guide Shoe

Long life for high production shops. Recommended for use if honing with diamonds. (Not recommended with 400 grit or finer stone sets.)

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

Additional abrasive specifications available to hone difficult materials.

Please contact Customer Service or your Sales & Application Engineer.

All Available Stones

Air Abrasive Stones		Grit Size							
		80	150	220	280	320	400	500	600
Aluminum Oxide Stones (A)									
Hard---Soft		C40-A25	C40-A45	C40-A55					
			C40-A47	C40-A57					
Silicon Carbide Stones (J,C)									
Hard---Soft		C40-J25	C40-J45	C40-J55			C40-J85	C40-J95	C40-C05
		C40-J27	C40-J47	C40-J56 C40-J57	C40-J67		C40-J87		

All in stock C40 stones sold in individual sets.

Recommended Stones for CV-4000 Large Hone

Material	Stone to Use	Approximate R _a Surface Finish	
		μm	μin
Fast removal in deburred, bored, ground or reamed holes			
Aluminum	C40-J57	1,38	55
Brass, Soft	C40-J55	1,38	55
Bronze	C40-J55	1,38	55
Cast iron	C40-J57	0,50	20
Steel, Soft	C40-A25	2,00	80
Steel, Hardened	C40-A55	0,45	18
Fine finishing in previously honed holes			
Aluminum	C40-J95	0,30	12
Brass, Soft	C40-J95	0,30	10
Bronze	C40-J95	0,30	10
Cast iron	C40-J95	0,10	4
Steel, Soft	C40-J95	0,12	8
Steel, Hard	C40-J95	0,08	3

PHT Plateau Honing Tools

Used as a final finishing step, after initial honing to provide a plateau surface on cylinder walls.

For Diameter Range		
mm	in	(320 Grit)
101,6-152,4	4.00-6.00	C40-PHT-731
152,4-203,2	6.00-8.00	C40-PHT-731

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MBB, & LBB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

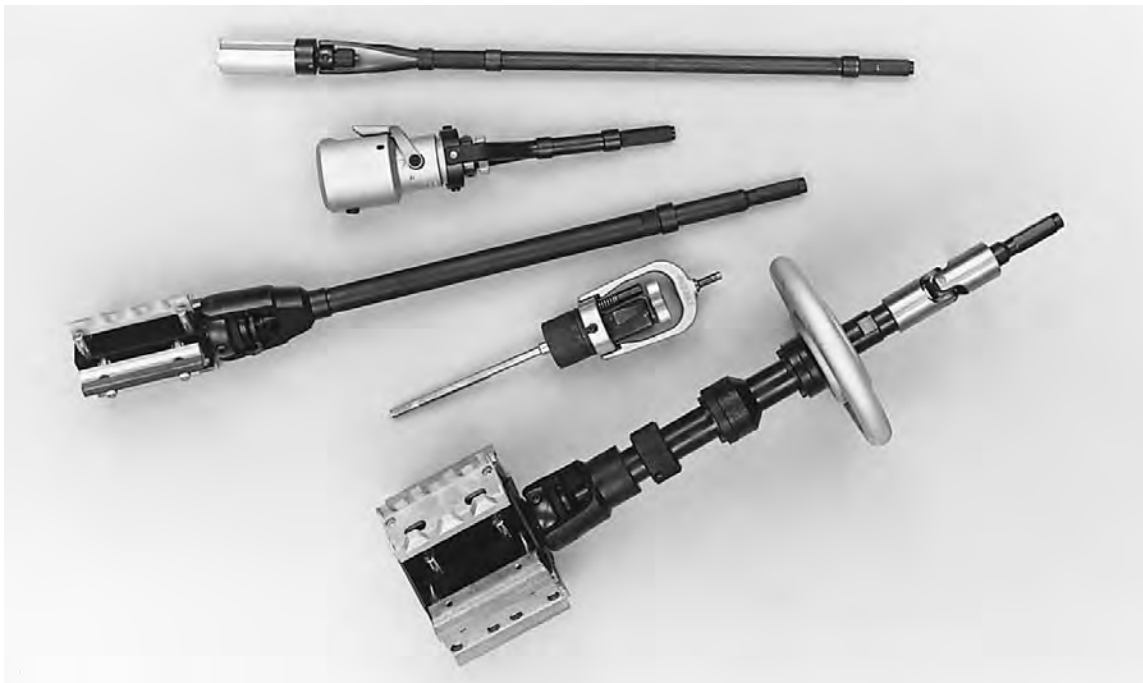
PORTABLE, MP & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

Notes

HONING UNIT SELECTION GUIDE	
PEDESTAL MACHINES (ML, EC, MBB, & LBB)	
PLATED TOOLING (KGM & VSS MACHINES)	
CYLINDER HONING (SV-410 & SV-10 MACHINES)	
PORTABLE, MPS & TUBE HONE ABRASIVES	
CUSTOM ABRASIVES & TOOLING	

Portable Hones



Fast and efficient for all kinds of bore-sizing work.

Corrects undersize, taper, out-of-round, barrel or bellmouth shape and misalignment to tolerances of .013mm (.0005") in diameters from 31,8-914mm (1.250"-36"). Larger sizes up to 1524mm (60") available on special order. Ideal for honing parts too big or awkward to bring to a machine tool.

What will Sunnen Portable Hones do for you?

- Repair production equipment on the spot with minimum delay
- Repair worn or scuffed air and hydraulic cylinders
- Resize bearings
- Recondition compressors, engines, pumps
- Pull tandem holes into line
- Repair hydraulic valves
- Remove tool marks from cylinders
- Hone I.D.'s for fit during machine assembly
- Clean up assembly or heat-treat distortion
- Correct I.D. errors in reject parts

Sunnen Portable Hones are capable of honing open, shouldered, blind, keyway, splined, tandem, or rifled bores to a uniform surface finish of .08-1.5 micrometer Ra (3-60 microinches Ra) in aluminum, welded, drawn or hardened steel, brass, ceramic, carbide, etc. They can be run in an electric drill, air drill, drill press, or honing rig.

How to select the Power Source for your Sunnen Portable Hone.

Sunnen Portable Hones may be driven by a heavy-duty electric drill, air drill, or drill press. Optimum RPM is calculated by dividing 1200 by the bore diameter in inches... for example: $1200 \div 6 \text{ inches} = 200 \text{ RPM}$; or dividing 30,000 by the bore diameter in millimeters... for example $30,000 \div 150 \text{ millimeters} = 200 \text{ RPM}$.

If the power source is a drill press or other rigid stroking device, make sure your portable hone is equipped with two universal joints to provide full floating action at the honing head.

Remote feed hones should always be used in a rig, either horizontally or vertically.

Choose the Proper Portable Hone for Your Application from pages 5.3-5.24.

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MB, & LB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MP, & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

For Portable Use of Machine Tooling

Universal Joint



Included with Remote Feed Portahone but must be ordered separately for Hand-Feed Portahones. Universal Joint is required on a hand-held unit to provide full floating action in a setup where the part and power source are rigidly mounted.

Order as follows:

AN-70

Universal Joint for Remote Feed Portahones with part numbers R_G-P28-1000VA through R_G-P28-1375WC and Hand-Feed Portahone with part numbers P_G-P20-750UA through P_G-P28-1375WC

AN-670

Universal Joint for Remote Feed Portahones with part numbers R_G-P28-1500WD through R_K-P28-5875SD and Hand-Feed Portahones with part numbers P_G-P28-1500WD through P_K-P28-5875SD

Quick Coupler



The quick couplers provide instant coupling or uncoupling of the Portahone and the drive motor – leaves hands free to gage the bore, or insert or remove the Portahone from the work.

Order as follows:

AN-80

Quick Coupler for Remote Feed Portahones with part numbers R_G-P28-1000VA through R_G-P28-1375WC and Hand-Feed Portahones with part numbers P_G-P20-750UA through P_G-P28-1375WC

AN-85

Quick Coupler for Remote Feed Portahones with part numbers R_G-P28-1500WD through R_K-P28-5875SD and Hand-Feed Portahones with part numbers P_G-P28-1500WD through

Driving Power

12,7 mm (1/2") chuck capacity required for Remote Feed Portahones diameter range 25,4 mm (1") through 66,8 mm (2.625") and for Hand-Feed Portahones diameter range 18,90 mm (.744") through 38,10 mm (1.500"). 15,0 mm (5/8") chuck capacity required for Remote Feed Portahones diameter range 66,8 to 152,4 mm (2.625" to 6.000") and for Hand-Feed Portahones diameter range 37,60 to 152,40 mm (1.480" to 6.000").

Open and Blind Hole Conversion

All Portahones 25,4 mm (1") size or larger can be easily converted for blind or open hole work. Call Customer Service Department for details.

AN-1055 Drill Motor Kit (220V, 50Hz)

(Does not come equipped with electrical plug)

AN-1060 Drill Motor Kit (115V, 60Hz)

For Sunnen Portable Equipment and Cylinder Hones



Sunnen Portable Hones may be driven by a wide variety of power units such as air drills, electric drills, hydraulic motors, radial drills, drill presses, etc.

The heavy duty, slow speed electric drill is one of the more popular methods of driving these hones. The AN-1055/1060 Drill Motor Kit is available from Sunnen for honing bores larger than five inches.

Furnished with Sunnen Quick Coupler, which has both AN-97 and AN-87 Yoke Adapters for direct connection to most Sunnen portable honing tools.

This drill motor kit is geared for the lower speeds and, as a result, has high torque. As a safety precaution, some method should be provided to take the honing torque off the operator.

The AN-1055/1060 Drill Motor is suggested for use with the AN-815 Portable Hone in the diameter range of five inches and larger. It may also be used with the AN-815 and other Sunnen Portable Hones for bores smaller than 127 mm (5"). However, better performance is usually obtained in smaller bores by using a drill motor having faster rpm.

AN-1075 Speed Control Unit

(Not available in 50Hz)



Bore sizes of about 203 mm (8") will hone satisfactorily at the 165 rpm full-load speed of the AN-1060 Drill Motor Kit (shown at the top of the page). For larger bores the use of the AN-1075 Speed Control Unit will provide even slower rpm from the drill motor.

The AN-1075 Speed Control Unit maintains approximately constant torque (not constant horsepower) of the drill motor as the speed is reduced. However, electric drill motors are fan cooled and the lower rpm does reduce the flow of cooling air. For this reason, we suggest that any electric drill be operated no slower than one-half of the full-load rpm. Considering this limitation, the AN-1075 Speed Control used with the AN-1060 Drill Motor will operate as slow as 82 rpm and will provide correct rpm for honing diameters as large as 381 mm (15").

Also may be used for speed control of other AC-DC drill motors and motors (brush-type only) where nameplate ampere rating is 15 amps or less.

SNJ-10 Portable Hone

Hand Feed

I.D. Range:
31,8 mm – 45 mm
1.250" – 1.770"

SNJ-10 Portable Hone shown assembled with Stone Set and AN-26A Drive Shank. Will hone bores up to 457 mm (18") long as shown; order additional Shaft Extensions for longer bores Requires 13 mm (1/2") chuck capacity.

Shaft Extensions

mm	in	Part Number
305	12	AN-241†
610	24	AN-242
1220	48	AN-244

Drive Shanks

mm	in	Part Number
76	3	AN-26A†

† Supplied with hone

How To Order

Specify SNJ-10 Basic Hone (includes 76 mm (3") Drive Shank, 205 mm (12") Extension, Yoke and Hone Head) See I-SNJ-100B for detailed repair parts.

Additional Shaft Extensions may be ordered from table below to make up any practical length. Drive Shank can be used with any combination of Extensions.

See Stone Sets Table at right.

Accessories

AN-70 Universal Joint

AN-80 Quick Coupler

See page 5.2

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

* 1st choice

** 2nd choice.
Use if A45 does not cut.

3rd choice.
Use if A43 does not cut.

PHT Plateau Honing Tools

Sunnen's PHT tools are used as a final finishing step, after initial honing to provide a plateau surface on cylinder walls.

For Diameter Range		Abrasive Sets (320 Grit)
mm	in	
38,1-42,9	1.50-1.69	SNJ1-PHT-732
42,4-47,2	1.67-1.86	SNJ2-PHT-732
44,4-49,3	1.75-1.94	SNJ3-PHT-732
48,5-53,3	1.91-2.10	SNJ4-PHT-732
52,8-57,6	2.08-2.27	SNJ5-PHT-732

All Available Stones

Grit Size	31,75-36,50mm 1.250"-1.437"	36,02-40,74mm 1.418"-1.604"	40,13-45,00mm 1.580"-1.770"
Aluminum Oxide			
150	SNJ1-A43 SNJ1-A45 SNJ1-A47	SNJ2-A43 SNJ2-A45 SNJ2-A47	SNJ3-A43 SNJ3-A45 SNJ3-A47
Silicon Carbide			
150	SNJ1-J45	SNJ2-J45	SNJ3-J17 SNJ3-J45
280	SNJ1-J63	SNJ2-J63	SNJ3-J63
400	SNJ1-J85 SNJ1-J87	SNJ2-J85 SNJ2-J87	SNJ3-J85 SNJ3-J87

Recommended Stones Sets

Material	Stone Sets* (Consists of 3 Stones) For General Purpose Honing			Approximate Ra Surface Finish	
	31,75-36,50mm 1.250"-1.437"	36,02-40,74mm 1.418"-1.604"	40,13-45,00mm 1.580"-1.770"	µm	µin
Fast removal: deburred, bored, ground, reamed holes					
Aluminum, Bronze	SNJ1-J45	SNJ2-J45	SNJ3-J45	2,00	80
Brass, Soft	SNJ1-J63	SNJ2-J63	SNJ3-J63	0,83	33
Carbide	—	—	—	—	—
Cast Iron	SNJ1-J45	SNJ2-J45	SNJ3-J45	0,80	32
Ceramic, Glass	—	—	—	—	—
Steel, Soft	SNJ1-A45	SNJ2-A45	SNJ3-A45	0,88	35
Steel, Hardened*	SNJ1-A45	SNJ2-A45	SNJ3-A45	0,50	20
Steel, Hardened**	SNJ1-A43	SNJ2-A43	SNJ3-A43	0,50	20
Steel, Very Hard***	SNJ1-J63	SNJ2-J63	SNJ3-J63	0,30	12
Fine finishing: previously honed holes					
Aluminum, Bronze	SNJ1-J87	SNJ2-J87	SNJ3-J87	0,38	15
Brass, Soft	SNJ1-J85	SNJ2-J85	SNJ3-J85	0,38	15
Carbide	—	—	—	—	—
Cast Iron	SNJ1-J87	SNJ2-J87	SNJ3-J87	0,15	6
Ceramic, Glass	—	—	—	—	—
Steel, Soft	SNJ1-J87	SNJ2-J87	SNJ3-J87	0,18	7
Steel, Hardened	SNJ1-J85	SNJ2-J85	SNJ3-J85	0,13	5

SN-75 Portable Hone

Hand Feed

I.D. Range:

44 mm – 51 mm

1.750" – 2"

SN-75 Portable Hone shown assembled with Stone Set, Drive Shank, and 305 mm (12") Shaft Extension. 102 mm (4") stone length. Will hone bores up to 533 mm (21") long as shown; order additional Shaft Extensions for longer bores. Requires 13 mm (1/2") chuck capacity.

How To Order

Specify SN-75 Basic Hone, (includes 76 mm (3") Drive Shank, 305mm (12") Extension one Universal Joint and Honehead. See page 5.8 for repair parts.).

Additional Shaft Extensions may be ordered from table below to make up any practical length. Drive Shank can be used with any combination of Extensions.

See Stone Sets Table on Page at right.

Drive Shanks

mm	in	Part Number
76	3	AN-26A*

Shaft Extensions

mm	in	Part Number
305	12	AN-241*
610	24	AN-242
1220	48	AN-244

* Supplied with hone

SNR-185 Portable Hone

Remote-Feed Midget Hone

I.D. Range:

44mm – 51mm

1.750" – 2"

SNR-185 Remote-Feed Midget Hone shown as supplied, except for Stone Set, which must be ordered separately. Will hone bore lengths up to 279 mm (11") as shown. Additional Shaft Extensions available for honing longer bores. Requires 13 mm (1/2") chuck capacity.

How To Order

Specify SNR-185 Remote-Feed Midget Hone, (includes AN-70 Universal Joint, JNR-110A Upper Feed Assembly, JNR-215A Feed Clutch and SNR-80 Midget Hone Head Assembly). See X-AN-5036B for detailed repair parts.

Shaft Extensions listed in table below may be used alone or combined to make up any practical length. Shaft Extensions are installed between Remote-Feed Unit and Hone Head Assembly.

See Stone Sets Table on Page at right.

Larger diameters from 51-66 mm (2.0"-2.6") can be honed by changing to larger Hone Head Assembly. To order, specify JNR-85 Hone Head Assembly.

Shaft Extensions

mm	in	Part Number
305	12	JNR-441
610	24	JNR-442
914	36	JNR-443
1219	48	JNR-444
1524	60	JNR-445
1829	72	JNR-446

Drive Shanks

mm	in	Part Number
76	3	AN-26A*

* Supplied with hone.

SN-75/SNR-185

Accessories and Stone Sets

Accessories

AN-70 Universal Joint



Order an additional Universal Joint when using the SN-75 in a drill press or other rigid stroking device. Use in place of Drive Shank AN-26A

AN-80 Quick Coupler



Provides instant coupling or uncoupling of hone from drive motor. Install between Drive Shank and Shaft Extension, or between Drive Shank and Hone Head on short bores.

PHT Plateau Honing Tools

For SN/SNR Hone

Sunnen's PHT tools are used as a final finishing step, after initial honing to provide a plateau surface on cylinder walls.

For Diameter Range		Abrasive Sets (320 Grit)
mm	in	
54,6-60,9	2.15-2.40	SN-PHT-732

In some cases, stones other than the RECOMMENDED STONES above may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. If the stone wears out too fast, use a harder stone; if it does not cut, use a softer stone.

Contact Customer Service for price and availability.

Recommended Stones Sets

Material	Stone Sets ^o (2 Stones & 2 Guides) For General Purpose Honing	Approximate Ra Surface Finish	
		µm	µin
Fast removal: deburred, bored, ground, reamed holes			
Aluminum, Bronze	S18-J45	2,00	80
Brass, Soft	S18-J63	0,83	33
Carbide	—	—	—
Cast Iron	S18-J45	0,80	32
Ceramic, Glass	—	—	—
Steel, Soft	S18-A45	0,88	35
Steel, Hardened*	S18-A45	0,50	20
Steel, Hardened**	S18-A43	0,50	20
Steel, Very Hard***	S18-J63	0,30	12
Fine finishing: previously honed holes			
Aluminum, Bronze	S18-J87	0,38	15
Brass, Soft	S18-J85	0,38	15
Carbide	—	—	—
Cast Iron	S18-J87	0,15	6
Ceramic, Glass	—	—	—
Steel, Soft	S18-J87	0,18	7
Steel, Hardened	S18-J85	0,13	5

- * 1st choice
 ** 2nd choice. Use if A45 does not cut.
 *** 3rd choice. Use if A43 does not cut.

Available Stones

		Grit Size						
		70	80	150	220	280	400	500 600
Soft	Aluminum Oxide			S18-A43 S18-A45 S18-A47	S18-A55 S18-A57	S18-A65 S18-A67		
			S18-A25	S18-A49				
Hard	Silicon Carbide	S18-J15		S18-J43 S18-J45 S18-J47	S18-J55	S18-J63 S18-J65 S18-J67	S18-J85 S18-J87	S18-J95
		S18-J17						

NOTE: For extremely rough bores use S18-XM51-X735 36 grit resin-bond aluminum oxide.

Superabrasive Stone Sets for Portable Hones

Metal Bond Diamond and CBN Stone Sets

Use to increase stock removal rates or abrasive life when compared to A or J stones, resin or vitrified diamond and CBN stones. First time users of metal bond superabrasive stone sets must order S18-KV1X Master Holder Set. Replacement stone can be ordered without reordering KV1X Master Holders.

Master Holder Number	Stone Set Number	Diameter Range	
		mm	in
S18-KV1X	S18-___XG94	44 - 51	1.75 - 2.00

The ___ in the stone set number is for the metal bond abrasive code. This set consists of two L12 superabrasive stones and (6) SNG6AFG roughing guides. Select the L12 metal bond superabrasive stone desired from the stone selection guide found on page 2.29. Contact Customer Service for price and availability.

Diamond and Resin CBN Sets

For honing carbide, ceramic, glass and hardened steel. Available in 82.55 mm (3-1/4") or 101.6 mm (4") stone length. For 82.55 (3-1/4") length add -85 to stone number.

Diamond Stone	Borazon Stone
DV-47*	NR53* Resin Bond
—	—
—	—
DV-07*	—

* Special Order - Contact Customer Service

JN-95 Portable Hone

Hand Feed

I.D. Range:

51 mm – 66 mm

2" – 2.600"

JN-95 Portable Hone shown assembled with Stone Set, Drive Shank, and 305 mm (12") Shaft Extension. 102 mm (4") stone length. Will hone bores up to 533 mm (21") long as shown; order additional Shaft Extensions for longer bores. Requires 13mm (1/2") chuck capacity.

Drive Shanks



mm	in	Part Number
76	3	AN-26A*

* Supplied with hone

Shaft Extensions



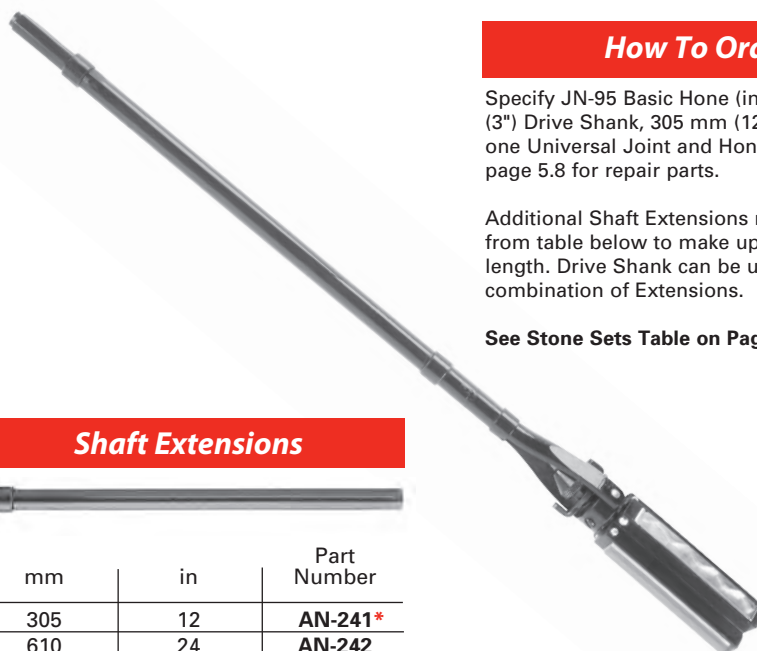
mm	in	Part Number
305	12	AN-241*
610	24	AN-242
1220	48	AN-244

How To Order

Specify JN-95 Basic Hone (includes 76 mm (3") Drive Shank, 305 mm (12") Extension, one Universal Joint and Hone Head). See page 5.8 for repair parts.

Additional Shaft Extensions may be ordered from table below to make up any practical length. Drive Shank can be used with any combination of Extensions.

See Stone Sets Table on Page at right.



JNR-210

Remote-Feed-Junior Hone

I.D. Range:

51 mm – 66 mm

2" – 2.600"

JNR-210 Remote-Feed Junior Hone as shown supplied, except for Stone Set, which must be ordered separately. Will hone bore lengths up to 305mm (12") as shown. Additional Shaft Extensions available for honing longer bores. Requires 13 mm (1/2") chuck capacity.

Drive Shanks



mm	in	Part Number
76	3	AN-26A*

*Supplied with hone.

How To Order

Specify JNR-210 Remote -Feed Junior Hone, (includes AN-70 Universal Joint, JNR-110A Upper Feed Assembly, JNR-215A Feed Clutch and JNR-85 Junior Hone Head Assembly). See X-AN-5036B for detailed repair parts. Shaft Extensions listed in table below may be used alone or combined to make up any practical length. Shaft Extensions are installed between Remote-Feed Unit and Hone Head Assembly.

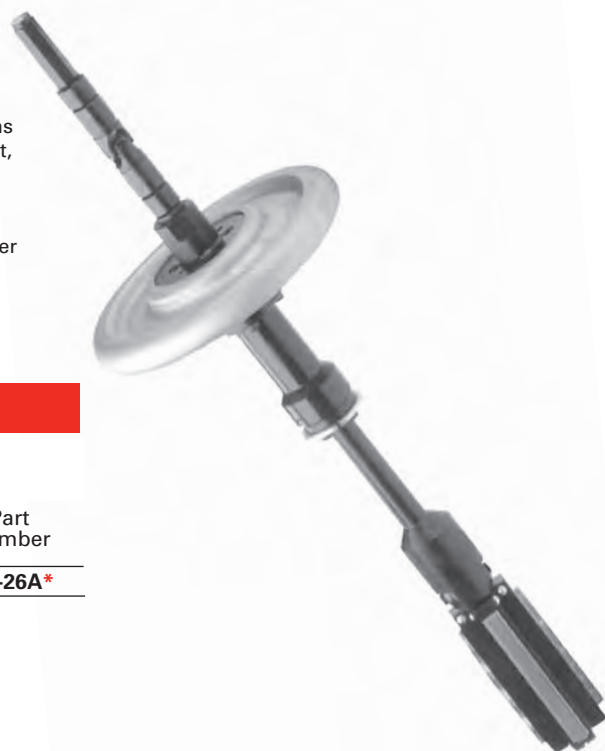
See Stone Sets Table on Page at right.

Smaller diameters from 44-51 mm (1.750"-2") can be honed by changing to smaller Hone Head Assembly. To order, specify SNR-80 Hone Head Assembly.

Shaft Extensions



mm	in	Part Number
305	12	JNR-441
610	24	JNR-442
914	36	JNR-443
1219	48	JNR-444
1524	60	JNR-445
1829	72	JNR-446



JN-95/JNR-210

Accessories and Stone Sets

Available Stones

Grit Size

Aluminum Oxide	80	T20-A25	U22-A25	V24-A25
	150	T20-A43 T20-A45 T20-A47	U22-A43 U22-A45 U22-A47	V24-A43 V24-A45 V24-A47
	220	T20-A55		
	280	T20-A65	U22-A65	U24-A65
Silicon Carbide	70	T20-J11 T20-J17	U22-J11 U20-J17	V24-J11 V24-J17
	150	T20-J43 T20-J45 T20-J47	U22-J43 U22-J45 U22-J47	U24-J43 V24-J45 V24-J47
	220	T20-J55	U22-J55	U24-J55
	280	T20-J63 T20-J65 T20-J67	U22-J63 U22-J65	V24-J63 V24-J65 V24-J67
	400	T20-J85 T20-J87	U22-J85 U22-J87	V24-J85 V24-J87
	600	T20-C05		

PHT Plateau Honing Tools

For JN/JNR Hone

Sunnen's PHT tools are used as a final finishing step, after initial honing to provide a plateau surface on cylinder walls.

For Diameter Range		Abrasive Sets (320 Grit)
mm	in	
60,9-66,0	2.40-2.60	JN0-PHT-732
66,0-71,1	2.60-2.80	JN1-PHT-731
71,1-76,2	2.80-3.00	JN2-PHT-731

NOTE: For extremely rough bores T20-XM51-X735 36 grit resin-bond aluminum oxide stone sets are available.

Accessories

AN-70 Universal Joint



Order an additional Universal Joint when using the JN-95 in a drill press or other rigid stroking device. Use in place of Drive Shank AN-26A

AN-80 Quick Coupler



Provides instant coupling or uncoupling of hone from drive motor. Install between Drive Shank and Shaft Extension, or between Drive Shank and Hone Head on short bores.

Recommended Stones Sets

Material	Stone Sets* (2 Stones and 2 Guides) For General Purpose Honing			Approximate Ra Surface Finish	
	51-56mm 2"-2.2"	56-61mm 2.2"-2.4"	61-66mm 2.4"-2.6"	µm	µin
Fast removal: deburred, bored, ground, reamed holes					
Aluminum, Bronze	T20-J45	U22-J45	V24-J45	2,00	80
Brass, Soft	T20-J63	U22-J63	V24-J63	0,83	33
Carbide*	—	—	—	—	—
Cast Iron	T20-J45	U22-J45	V24-J45	0,80	32
Ceramic, Glass*	—	—	—	—	—
Steel, Soft	T20-A45	U22-A45	V24-A45	0,88	35
Steel, Hardened	T20-A45	U22-A45	V24-A45	0,50	20
Steel, Hardened	T20-A43	U22-A43	V24-A43	0,50	20
Steel, Very Hard	T20-J63	U22-J63	V24-J63	0,30	12
Fine finishing: previously honed holes					
Aluminum, Bronze	T20-J87	U22-J87	V24-J87	0,83	15
Brass, Soft	T20-J85	U22-J85	V24-J85	0,38	15
Carbide*	—	—	—	—	—
Cast Iron	T20-J87	U22-J87	V24-J87	0,15	6
Ceramic, Glass*	—	—	—	—	—
Steel, Soft	T20-J87	U22-J87	V24-J87	0,18	7
Steel, Hardened	T20-J85	U22-J85	V24-J85	0,13	5

* In some cases, stones other than those recommended above may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. If the stone wears out too fast, use a harder stone; if it does not cut, use a softer stone.

Metal Bond Diamond and CBN Stone Sets

Use to increase stock removal rates or abrasive life when compared to A or J stones, resin or vitrified diamond and CBN stones. First time users of metal bond superabrasive stone sets must order S18-KV1X Master Holder Set. Replacement stone can be ordered without reordering KV1X Master Holders.

* Special Order - Contact Customer Service

Superabrasive Stone Sets for Portable Hones

Master Holder Number	Stone Set Number	Diameter Range	
		mm	inches
T20-KV1X	T20-__XG94	51 - 56	2.0 - 2.2
U22-KV1X	U22-__XG94	56 - 61	2.2 - 2.4
V24-KV1X	V24-__XG94	61 - 66	2.4 - 2.6

The __ in the stone set number is for the metal bond abrasive code. This set consists of two L12 superabrasive stones and (6) JN66A7G (T20), JN67A7G (U22) or JN63AFG (V24) roughing guides. Select the L12 metal bond superabrasive stone desired from the stone selection guide found on page 2.29.

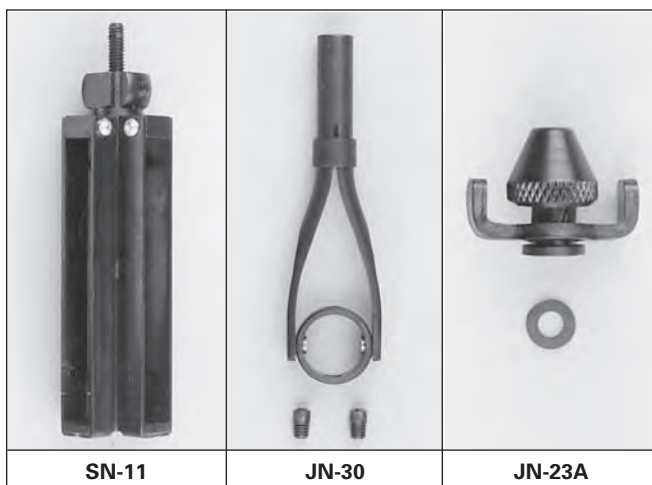
Diamond and Resin Borazon/CBN Sets

For honing carbide, ceramic, glass and hardened steel. Available in 82.55 mm (3 1/4") or 101.6 mm (4") stone length. For 82.55 (3 1/4") length add -85 to stone number.

Diamond Stone	Borazon Stone
DV-47*	NR53 Resin Bond*
DV-57*	—
DV-87*	—
DV-07*	—

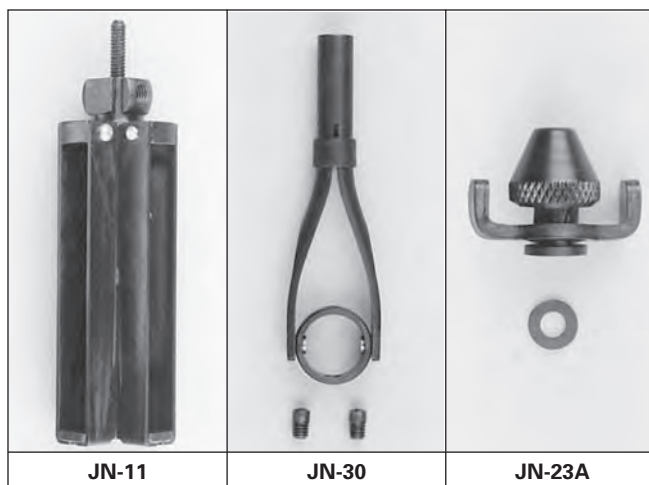
Portable Hones & Repair Parts

SN-75 Portable Hone



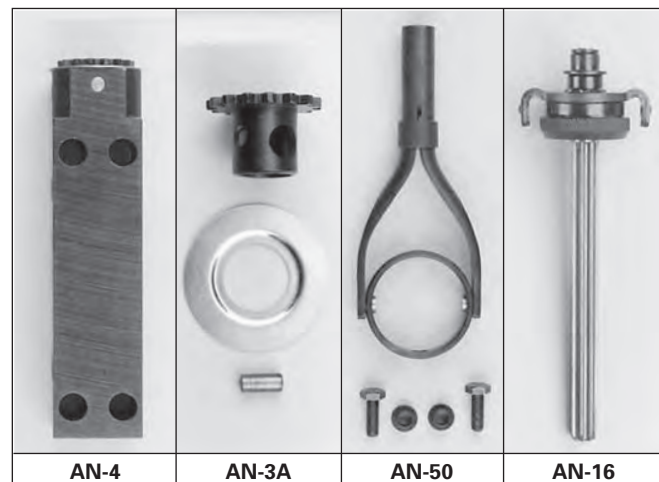
SN-11 Hone Body
JN-30 Universal Joint Complete
JN-23A Adjusting Nut and Washer

JN-95 Portable Hone



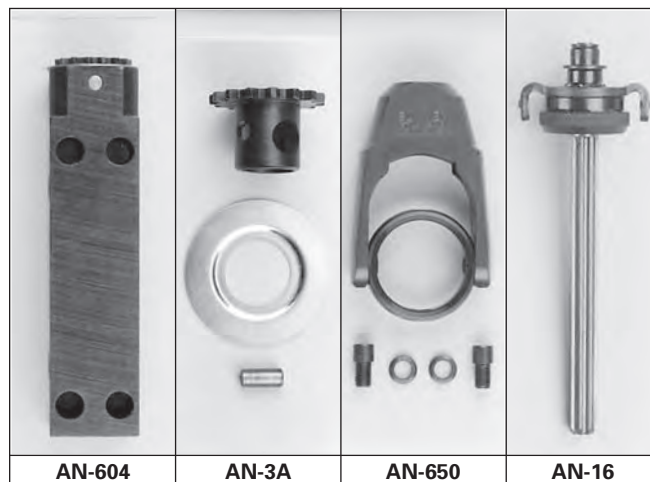
JN-11 Hone Body
JN-30 Universal Joint Complete
JN-23A Adjusting Nut and Washer

AN-112 Portable Hones



AN-4 Hone Body
AN-3A Body Gear
AN-50 Universal Joint Complete
AN-16 Center Pinion Adjustment

AN-815 Portable Hone



AN-604 Hone Body
AN-3A Body Gear Set
AN-650 Universal Joint Complete
AN-16 Center Pinion Adjustment

AN-112 Portable Hone

Hand Feed For Occasional Light-Duty Portable Honing

I.D. Range:
64 mm – 178 mm
2.5"–7"

AN-112 Portable Hone shown assembled with Stone Set, (includes 76mm (3") Drive Shank, 305mm (12") Shaft Extension, Universal Joint and Hone Head) shown. 102mm (4") stone length. Requires 13mm (1/2") chuck capacity. See page 5.8 for repair parts.

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MB, & LBB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MP3 & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

Order 1-5 For Complete AN-112 Portable Hone

Diameter Range 64 mm - 178 mm 2.5" - 7"				1 Basic Hone	2 Master Holder Sets		3 Stone Support	4 Stone Set	5 Shaft Extension
General Purpose Stone Sets		Guideless and Keyway Stone Sets				Single Length	Double Length		
mm	in	mm	in					See tables on pages 5.15-5.16 for portable hone stone sets.	For holes longer than 508mm (20") see table below for shaft extensions.
64-140	2.5-5.5	64-142	2.5-5.6	AN-112		None	None		
104-160	4.1-6.3	114-165	4.5-6.5	AN-112		AN-345	None		
119-178	4.7-7.0	130-183	5.1-7.2	AN-112		AN-355	AN-855		

Drive Shanks



mm	in	Part Number
76	3	AN-26A*

Shaft Extensions



mm	in	Part Number
305	12	AN-241*
610	24	AN-242
1220	48	AN-244

* Furnished with 76mm (3") Drive Shank and 305mm (12") Shaft Extension. Other shanks or extensions may be selected from the table above to make up any practical length (either drive shank can be used with any combination of extensions).

Accessories

AN-70 Universal Joint

Order an additional Universal Joint when using the AN-112 in a drill press or other rigid stroking device. Use in place of Drive Shank.



Master Holder Sets

Stone

Stones



Single Length Master Holder



Double Length Master Holder

Master Holder Sets, listed in the table above, are used with Type W47, WW51, and WY51 Stone Sets. Double Length Master Holders require two stone sets- use when it is necessary to bridge interruptions in the bore. Each Master Holder Set consists of two holders for stones and two holders for guides.

AN-80 Quick Coupler

AN-87 Replacement Yoke Adapter

AN-79A Replacement Coupler Sleeve



Provides instant coupling or uncoupling of hone from drive motor.

AN-815 Portable Hone

Hand Feed For Occasional Heavy-Duty Portable Honing

I.D. Range:

64 mm – 533 mm

2.5"–21"

AN-815 Portable Hone (includes 152 mm (6") Drive Shank, 610 mm (24") Shaft Extension, Universal Joint and Hone Head) shown assembled with single length master holder set and stone set. Requires 16 mm (5/8") chuck capacity for 63.5-127 mm (2.5"-5") diameter. Requires 19 mm (3/4") chuck capacity for 127-381 mm (5"-15") diameter. Requires 25.4 mm (1") chuck capacity for larger than 381 mm (15") diameter. See page 5.8 for repair parts.



Order 1-5 For Complete AN-815 Portable Hone

Diameter Range 64 mm - 533 mm 2.5" - 21"				1 Basic Hone	2 Master Holder Sets	3 Stone Support	4 Stone Set	5 Shaft Extension	
General Purpose Stone Sets		Guideless and Keyway Stone Sets			Single Length	Double Length			
mm	in	mm	in						
64-140	2.5-5.5	64-142	2.5-5.6	AN-815	None	None	None	See tables on pages 5.15-5.16 for portable hone stone sets.	For holes longer than 508mm (20") see table below for Shaft Extensions.
104-160	4.1-6.3	114-165	4.5-6.5	AN-815	AN-345	None	None		
119-178	4.7-7.0	130-183	5.1-7.2	AN-815	AN-355	AN-855	None		
152-229	6.0-9.0	163-234	6.4-9.2	AN-815	AN-365	AN-865	AN-260		
206-305	8.1-12.0	213-310**	8.4-12.2**	AN-815	AN-375	AN-875	AN-280		
279-381	11.0-15.0	284-386**	11.2-15.2**	AN-815	AN-385	AN-885	AN-290		
356-457	14.0-18.0	363-465**	14.3-18.3**	AN-815*	AN-395	AN-895	AN-340		
432-533	17.0-21.0	437-538**	17.2-21.2**	AN-815*	AN-415	AN-915	AN-450		

* For light work only in this diameter range.

** Do not use WW (Guideless) Stone Sets in this range due to lack of stability.

Accessories

AN-670 Universal Joint



Order an additional Universal Joint when using the AN-815 in a drill press or other rigid stroking device.

Drive Shanks



mm	in	Part Number
76	3	AN-608A
152	6	AN-618A†

† Supplied with hone.

Shaft Extensions



mm	in	Part Number
152	6	AN-840
305	12	AN-841†
610	24	AN-842
1220	48	AN-844

Master Holder Sets

Stone



Single Length Master Holder

Stones



Double Length Master Holder

Stone Support



AN-85

Quick Coupler

Provides instant coupling or uncoupling of hone from drive motor.

AN-97 Replacement Yoke Adapter



AN-89A Replacement Coupler Sleeve



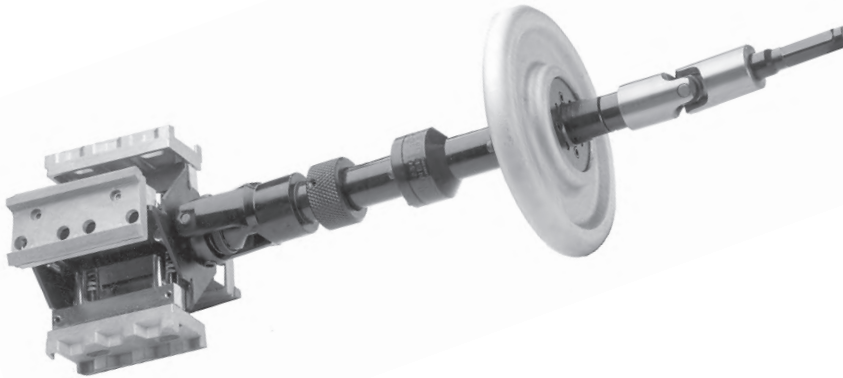
Master Holder Sets, listed in the table above, are used with Type W47, WW51 and WY51 Stone Sets. Double Length Master Holders require two stone sets—use when it is necessary to bridge interruptions in the bore. Each Master Holder Set consists of two holders for stones and two holders for guides.

Stone Supports are required to give rigidity to the hone assembly when honing bores larger than 178 mm (7") diameter.

ANR-275 Wide Range Hone

Remote Feed– For Heavy-Duty Production Honing –
to be used in a machine or honing rig

I.D. Range:
64 mm – 533 mm
2.5"–21"



ANR-275 Portable Hone (includes Universal Joint, Upper Feed Assembly, Feed Clutch and Hone Head) shown assembled with Stone Support, Single Length Master Holder Set and Stone Set. 102 mm (4") stone length (203 mm [8"] when two sets of stones are used with Double Length Master Holder Set.) Requires 16 mm (5/8") chuck capacity for 63,5-127 mm (2.5"-5") diameter. Requires 19 mm (3/4") chuck capacity for 127-381 mm (5"-15") diameter. Requires 25,4 mm (1") chuck capacity for larger than 381 mm (15") diameter. See I-ANR-275D for repair parts and operating instructions.

Order 1-5 For Complete ANR-275 Portable Hone

Diameter Range 64 mm - 533 mm 2.5" -21"				1 Basic Hone	2 Master Holder Sets		3 Stone Support	4 Stone Set	5 Shaft Extension
General Purpose Stone Sets		Guideless and Keyway Stone Sets			Single Length	Double Length			
mm	in	mm	in						
64-140	2.5-5.5	64-142	2.5-5.6	ANR-275	None	None	None	See tables on pages 5.15-5.16 for portable hone stone sets.	For holes longer than 229mm (9") see table below for Shaft Extensions.
104-160	4.1-6.3	114-165	4.5-6.5	ANR-275	AN-345	None	None		
119-178	4.7-7.0	130-183	5.1-7.2	ANR-275	AN-355	AN-855	None		
152-229	6.0-9.0	163-234	6.4-9.2	ANR-275	AN-365	AN-865	AN-260		
206-305	8.1-12.0	213-310**	8.4-12.2**	ANR-275	AN-375	AN-875	AN-280		
279-381	11.0-15.0	284-386**	11.2-15.2**	ANR-275	AN-385	AN-885	AN-290		
356-457	14.0-18.0	363-465**	14.3-18.3**	ANR-275*	AN-395	AN-895	AN-340		
432-533	17.0-21.0	437-538**	17.2-21.2**	ANR-275*	AN-415	AN-915	AN-450		

* For light work only in this diameter range.

** Do not use WW (Guideless) Stone Sets in this range due to lack of stability.

Drive Shanks



mm	in	Part Number
76	3	AN-608A†
152	6	AN-618A

Shaft Extensions

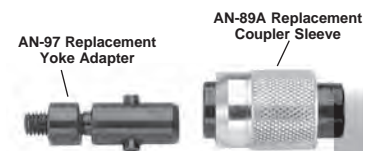


mm	in	Part Number
235	9.25	ANR-741
483	19.00	ANR-742
1086	42.75	ANR-744
1835	72.25	ANR-746

Accessories

AN-85 Quick Coupler

Provides instant coupling or uncoupling of hone from drive motor.



Master Holder Sets

Stone

Stones

Stone Support



Single Length Master Holder



Double Length Master Holder



Master Holder Sets, listed in the table at left, are used with Type W47, WW51, and WY51 Stone Sets. Double Length Master Holders require two stone sets– use when it is necessary to bridge interruptions in the bore. Each Master Holder Set consists of two holders for stones and two holders for guides.

Stone Supports are required to give rigidity to the hone assembly when honing bores larger than 178 mm (7") diameter.

GNH Giant Portable Hone

Hand Feed– For large diameter or heavy-duty honing above 254mm (10")

I.D. Range:

254 mm – 1524 mm

10"–60"

GNH-1510 Hand-Feed Giant Hone shown assembled with honing stones and drive shank. Order additional shaft extensions for longer bores. All giant hones require 2 sets of W47 or WY51 stones to load the hone. (See Tables on pages 5.15-5.16 for Stone sets for GNH Hones.)

Drive Source

Drive motors of 2.2-3.7KW (3 to 5 HP) provide adequate torque to turn the hone. These hones may be driven by a rigidly mounted power source such as a radial drill press or a large lathe; 29 mm (1-1/8") chuck capacity is required. A second universal joint, AN-970, is needed between the machine spindle and the drive shaft to allow for full floating action of the head.

To Order:

Select the correct Giant Hone, drive shaft extension (for bore length 304 mm [12"] or longer and universal joint, if needed).

Drive Shaft Extensions



mm	in	Part Number
152	6	GNH-6+
305	12	GNH-12+
610	24	GNH-24+
915	36	GNH-36+
1220	48	GNH-48+
1524	60	GNH-60+
1830	72	GNH-72+



ANH-16 Hand Feed Pinion Assembly



GNR-918A Drive Shank



Hand-Feed Giant Hones

Diameter Range		Part Number	Shipping Weight	
mm	inches		kg	lbs.
254-381	10-15	GNH-1010	6	13
381-508	15-20	GNH-1510	8,2	18
508-711	20-28	GNH-2010	19	42
711-914	28-36	GNH-2810	31	68
914-1118	36-44	GNH-3610+		
1118-1321	44-52	GNH-4410+		
1321-1524	52-60	GNH-5210+		

* Special Order - Contact Customer Service

Remote Feed Conversion for hand-feed hones:

Hand-Feed Giant Portable Hones may be converted to remote feed operation by ordering the following:

GNR-920 Remote-Feed Drive Unit
ANR-210A Pinion Adjustment Assembly

Drive Shaft Extensions for Remote Feed Hones are listed at right.

Recommended RPM: To establish optimum RPM for your application, divide 1,200 by bore diameter in inches.

EX: $1,200 \div 10 = 120(\text{RPM})$.

Or, divide 30,000 by bore diameter in mm.

EX: $30,000 \div 254 = 118(\text{RPM})$.

GNR Giant Portable Hone

For large diameter work on deep bores, production honing, or parts with limited access for stone adjustment in diameters larger than 254mm (10")

I.D. Range:
254 mm – 1524 mm
10"–60"



GNR-1010 Remote-Feed Giant Hone shown assembled with honing stones. Will hone bores up to 304mm (12") long as shown. Order additional drive shafts for longer bores. All giant hones require 2 sets of W47 or WY51 stones to load the hone. (See Tables on pages 5.15-5.16 for Stone sets for GNR Hones.)

The remote feed permits the operator to expand the stones at any time while the honing head is running in the bore, as well as when the hone is stopped. The operator controls the amount of stone expansion and the honing pressure by braking the feed wheel while the hone is turning. The remote feed also permits the operator to quickly retract the stones and remove the hone from the bore when the hone is stopped.

Drive Source

Drive motors of 2.2-3.7KW (3 to 5 HP) provide adequate torque to turn the hone. These hones may be driven by a rigidly mounted power source such as a radial drill press or a large lathe; 29 mm (1-1/8") chuck capacity is required.

Remote-Feed Giant Hones are equipped with two universal joints which allow the honing head to align itself with the workpiece.

Recommended RPM: To establish optimum RPM for your application, divide 1200 by bore diameter in inches.

EX: $1,200 \div 10 = 120$ (RPM).

Or, divide 30,000 by bore diameter in mm.

EX: $30,000 \div 254 = 118$ (RPM).

To Order:

Select the correct Giant Hone, drive shaft extension (for bore length 304 mm [12"] or longer and universal joint, if needed).

Remote-Feed Giant Hones				
Diameter Range		Part Number	Shipping Weight	
mm	in		kg	lbs.
254-381	10-15	GNR-1010	13,2	29.5
381-508	15-20	GNR-1510	15,7	34.5
508-711	20-28	GNR-2010	26,5	58.5
711-914	28-36	GNR-2810	38,4	84.5
914-1118	36-44	GNR-3610*		
1118-1321	44-52	GNR-4410*		
1321-1524	52-60	GNR-5210*		

* Special Order - Contact Customer Service

Additional Hone Heads Extend the Diameter Range

A complete Remote-Feed Giant Hone consists of a GNR-920 Remote-Feed Giant Drive Unit and a Giant Hone Head, as illustrated. The GNR-920 Remote-Feed Giant Drive Unit can be used with other Giant Hone Heads to extend the diameter range. Select additional Hone Heads as needed from the table below.



Additional Hone Heads				
Diameter to be Honed		Part Number for Giant Hone Head**	Shipping Weight	
mm	inches		kg	lbs.
254-381	10-15	GNR-1025	4,1	9
381-508	15-20	GNR-1525	6,4	14
508-711	20-28	GNR-2025	17,3	38
711-914	28-36	GNR-2825	29,1	64
914-1118	36-44	GNR-3625*		
1118-1321	44-52	GNR-4425*		
1321-1524	52-60	GNR-5225*		

** These Hone Heads can be converted to complete Giant Hones at any time by purchasing GNR-920 Remote-Feed Giant Drive Unit.

* Special Order - Contact Customer Service

Drive Shaft Extensions

Giant Hones will handle bore lengths up to 305mm (12") without Drive Shaft Extensions. When Extensions are necessary, they can be used one at a time or in multiples, making it possible to hone practically any bore length. All Drive Shaft Extensions are installed between the hone head and the feed wheel as illustrated above. The feed wheel remains outside the bore being honed, accessible for stone expansion.

Drive Shaft Extensions				
Extension Length		Part Number	Shipping Weight	
mm	in		kg	lbs.
152	6	GNR-940	1,4	3
305	12	GNR-941	2,4	5
610	24	GNR-942	4,8	10.5
915	36	GNR-943	6,4	14
1220	48	GNR-944	8,2	18
1525	60	GNR-945	9,6	21
1830	72	GNR-946	10,6	23.25

Piloted Portable Hones

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MBB, & LBB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MPS & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

Use to hone one bore in line with another bore on the same axis. Three models cover the diameter range of 44,5-533,4mm (1.75"-21").



AN-815-A40X Piloted Portable Hone
Diameter Range: 63.5mm-533.4mm (2.50"-21")

The SN-75-887X and JN-95-887X Piloted Portable Hones are furnished with a 25,4 mm (1") diameter pilot bar. The AN-815-A40X is furnished with a 38,1 mm (1-1/2") diameter pilot bar. The pilot bar must be long enough so that it will not stroke out of the pilot bushing during the honing operation.

BE SURE TO SPECIFY PILOT LENGTH BAR on your order.

The pilot bushing is made by the user. It must be made to fit the bore before and after honing. The bushing O.D. should be tapered to fit the bore opposite the bore being honed. The bushing I.D. should be .025 mm (.001") larger than the diameter of the pilot on the hone.

The hone is used first in one bore with the pilot bushing positioned in the other bore. When this bore is finished, the pilot bushing is placed in the honed bore and the hone is entered from the other side to finish the second bore. Both outside ends of the tandem bores must be accessible.

SN-75-887X Piloted Portable Hone, 44,5 mm-50,8 mm (1.75"-2.00") diameter range, includes 76,0 mm (3") drive shaft, 304,8 mm (12") shaft extension, and 25,4 mm (1") diameter pilot bar up to 610 mm (24") long (does not include stone sets).

JN-95-887X Piloted Portable Hone, 50,8 mm-60,0 mm (2.00"-2.60") diameter range, includes 76,0 mm (3") drive shaft, 304,8 mm (12") shaft extension, and 25,4 mm (1") diameter pilot bar up to 610 mm (24") long (does not include stone sets).

Extra length 25,4 mm (1") diameter pilot bar for SN-75-887X or JN-95-887X hones will be supplied at an added price per foot or portion thereof, over the 610 mm (24") furnished with the hone.

AN-815-A40X Piloted Portable Hone, 63,5 mm-533,4 mm (2.50"-21.00") diameter range for light duty use in diameters larger than 381 mm (15"), includes 152,4 mm (6") drive shaft, 304,8 mm (12") shaft extension, and 38,1 mm (1.5") diameter pilot bar up to 610 mm (24") long (does not include stone sets, stone supports or master holder sets).

Extra length 38,1 mm (1.5") diameter pilot bar for AN-815-A40X hone will be supplied at an added price per foot or portion thereof, over the 610 mm (24") furnished with the hone.

The SN-75-887X Piloted Portable Hone uses the same S18 stone sets as the SN-75 Portable Hone. The JN-95-887X Piloted Portable Hone uses the same T20, U22 or V24 stone sets as the JN-95 Portable Hone. See page 5.7 for stone selection. Stone sets, stone supports and master holder sets used with the AN-815-A40X Piloted Portable Hone are found on page 5.10.

These hones may be driven by a heavy duty electric or air drill, or used in a drill press. To establish optimum rpm for your application, divide 1200 by the hole diameter in inches. Example: $1200 \div 6" = 200$ (RPM). Or, divide 30000 by bore diameter in mm. Example: $30000 \div 150 \text{ mm} = 200$ (RPM).




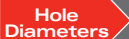
Hole Size		Recommended Drill Chuck Size	
mm	in	mm	in
44,45-127,0	1.75-5	15,8	5/8
127,0-381,0	5-15	19,0	3/4
381,0 and up	15 and up	25,4	1

A universal joint is built into each of these piloted portable hones. A second universal joint is required when the driving power is obtained from a drill press, or other rigid stroking device to provide the necessary full floating action at the honing head as shown below:

For Piloted Portable Hone	Order Additional Universal Joint
SN-75-887X	AN-70
JN-95-887X	AN-70
AN-815-A40X	AN-670 (Heavy-Duty)

Recommended Stones

For AN/ANR, GNH/GNR Portable Hones

For Holes Without Keyways										For Holes With Keyways					
															
General Purpose Stone Sets (2 Stones and 2 Guides)					Guideless Stone Sets (Not recommended for use above 254mm & 10°)					Keyway Stone Sets Maximum Keyway Width					
	64 to 69mm (2.5"-2.7")	69 to 104mm (2.7"-4.1")	89 to 140mm (3.5"-5.5")	104 to 152mm (4.1"-60")†	64 to 84mm (2.5"-3.3")	84 to 107mm (3.3"-4.2")	102 to 142mm (4.0"-5.6")	114 to 152mm (4.5"-60")†	20.3mm (.8")	22.86mm (.9")	30.48mm (1.2")	35.56mm (1.4")	Approx. R _a Surface Finish µm µin		
									64 to 84mm (2.5"-3.3")	84 to 107mm (3.3"-4.2")	102 to 142mm (4.0"-5.6")	114 to 152mm (4.5"-60")†			
Fast removal: deburred, bored, ground, reamed holes															
Aluminum	G25-J45	M27-J45	N37-J45	W47-J45	GG25-J45	MM33-J45	NN40-J45	VW51-J45	GY25-J45	MY33-J45	NY40-J45	WY51-J45	2.00	80	
Brass, Soft	G25-J65	M27-J65	N37-J65	W47-J65	GG25-J65	MM33-J65	NN40-J65	VW51-J65	GY25-J65	MY33-J65	NY40-J65	WY51-J65	0.83	33	
Bronze	G25-J45	M27-J45	N37-J45	W47-J45	GG25-J45	MM33-J45	NN40-J45	VW51-J45	GY25-J45	MY33-J45	NY40-J45	WY51-J45	2.00	80	
Carbide	—	—	—	—	—	—	—	—	—	—	—	—	0.75	30	
Cast Iron	G25-J45	M27-J45	N37-J45	W47-J45	GG25-J45	MM33-J45	NN40-J45	VW51-J45	GY25-J45	MY33-J45	NY40-J45	WY51-J45	0.80	32	
Ceramic	—	—	—	—	—	—	—	—	—	—	—	—	1.00	40	
Glass	—	—	—	—	—	—	—	—	—	—	—	—	1.80	70	
Steel, Soft	G25-A45	M27-A45	N37-A45	W47-A45	GG25-A45	MM33-A45	NN40-A45	VW51-A45	GY25-A45	MY33-A45	NY40-A45	WY51-A45	0.88	35	
Steel, Hardened*	G25-A45	M27-A45	N37-A45	W47-A45	GG25-A45	MM33-A45	NN40-A45	VW51-A45	GY25-A45	MY33-A45	NY40-A45	WY51-A45	0.50	20	
Steel, Very Hard**	G25-NR53	M27-NR53	N37-NR53	W47-NR53	—	—	—	—	—	—	—	—	1.00	40	
Fine finishing: previously honed holes															
Aluminum,	G25-J87	M27-J87	N37-J87	W47-J87	GG25-J87	MM33-J87	NN40-J87	VW51-J87	GY25-J87	MY33-J87	NY40-J87	WY51-J87	0.38	15	
Brass, Soft	G25-J85	M27-J85	N37-J85	W47-J85	GG25-J85	MM33-J85	NN40-J85	VW51-J85	GY25-J85	MY33-J85	NY40-J85	WY51-J85	0.38	15	
Bronze	G25-J87	M27-J87	N37-J87	W47-J87	GG25-J87	MM33-J87	NN40-J87	VW51-J87	GY25-J87	MY33-J87	NY40-J87	WY51-J87	0.38	15	
Carbide	—	—	—	—	—	—	—	—	—	—	—	—	0.18	7	
Cast Iron	G25-J87	M27-J87	N37-J87	W47-J87	GG25-J87	MM33-J87	NN40-J87	VW51-J87	GY25-J87	MY33-J87	NY40-J87	WY51-J87	0.15	6	
Ceramic	—	—	—	—	—	—	—	—	—	—	—	—	0.50	20	
Glass	—	—	—	—	—	—	—	—	—	—	—	—	0.75	30	
Steel, Soft	G25-J87	M27-J87	N37-J87	W47-J87	GG25-J87	MM33-J87	NN40-J87	VW51-J87	GY25-J87	MY33-J87	NY40-J87	WY51-J87	0.18	7	
Steel, Hardened	G25-J85	M27-J85	N37-J85	W47-J85	GG25-J85	MM33-J85	NN40-J85	VW51-J85	GY25-J85	MY33-J85	NY40-J85	WY51-J85	0.13	5	

*1st choice

**2nd choice. Use if A43 does not cut.

†These stones require the use of Master Holders.

Superabrasive Stone Sets

Metal Bond Diamond and CBN Stone Sets

Available in G25, M27, N37, and W47 stone sizes. These stones can be used to increase stock removal rates or abrasive life when compared to A or J stones or Resin or Vitrified Diamond or CBN stones. First time users of metal bond superabrasive stone sets must order ____-KB5X (G25-KB5X) Master Holder Set. Replacement stones can be ordered without reordering KB5X Master Holders.

* Special Order - Contact Customer Service

Master Holder Number	Stone Set Number	Diameter Range	
		mm	in
G25-KB5X	G25-____XG55	64-69	2.5 - 2.7
M27-KB5X	M27-____XG55	69-104	2.7-4.1
N37-KB5X	N37-____XG55	89-140	3.5-5.5
W47-KB5X	W47-____XG55	104-533	4.1-21

The ____ in the stone set number is for the metal bond abrasive code. This stone set consists of two L16 super-abrasive stones and (6) A43CFG (G25), AN43BFG (M27), AN62BFG (N37), or AN341AFG (W47) roughing guides. Select the L16 metal bond superabrasive stone desired from the stone selection guide found on page 2.33.

Vitrified Bond Diamond and Resin CBN Sets

For honing carbide, ceramic, glass and hardened steel. Available in 82,55 mm (3.25") or 101,6 mm (4") stone length. For 82,55 mm (3.5") length, add -85 to stone number.

Diamond Stone	CBN Stone
DV-47	NR53 Resin Bond
DV-57	NR83 Resin Bond
DV-87	—
DV-07	—

Stones

For AN, ANR, GNH, GNR Honing Units

Grit Size	General Purpose				Guideless				Maximum Keyway Width				
	64 to 69mm (2.5"-2.7")	69 to 104mm (2.7"-4.1")	89 to 140mm (3.5"-5.5")	104 to 1524mm (4.1"-60")	64 to 84mm (2.5"-3.3")	84 to 107mm (3.3"-4.2")	102 to 142mm (4.0"-5.6")	114 to 1524mm (4.5"-60")	20,3mm (.8")	22,8mm (.9")	30,4mm (1.2")	36,5mm (1.4")	
	Aluminum Oxide Stones												
	G25	M27	N37	W47†	GG25	MM33	NN40	WW51†	GY25	MY33	NY40	WY51†	
36	H-S			W47-E47 W47-M51	GG25-M51	MM33-M51						WY51-M51	
80	H-S	G25-A23 G25-A25 G25-A27	M27-A23 M27-A25 M27-A27	N37-A23 N37-A25 N37-A27	W47-A23 W47-A25 W47-R25	GG25-A25	MM33-A25	NN40-A25	WW51-A25	GY25-A25	MY33-A25	WY51-A23 WY51-A25	
150	H-S	G25-A43 G25-A45 G25-A45N	M27-A43 M27-A45 M27-A45N	N37-A43 N37-A45 N37-A45N	W47-A27 W47-R27 W47-A43 W47-A45 W47-A45N	GG25-A43 GG25-A45 GG25-A47	MM33-A43 MM33-A45 MM33-A47	NN40-A43 NN40-A45 NN40-A47	WW51-A43 WW51-A45	GY25-A43 GY25-A45 GY25-A47	MY33-A43 MY33-A45 MY33-A47	NY40-A43 NY40-A45 NY40-A47	WY51-A43 WY51-A45 WY51-A47
220	H-S	G25-A47	M27-A47 M27-A49	N37-A47 N37-A49	W47-A47 W47-A49								
280	H-S	G25-A65 G25-A67	M27-A55 M27-A63 M27-A65 M27-A67	N37-A55 N37-A65	W47-A55 W47-A57 W47-A63 W47-A65 W47-A67	GG25-A65	MM33-A65	NN40-A65	WW51-A65	GY25-A65	MY33-A65	NY40-A65	WY51-A65
Silicon Carbide Stones													
	G25	M27	N37	W47†	GG25	MM33	NN40	WW51†	GY25	MY33	NY40	WY51†	
70	H-S	G25-J15 G25-J17	M27-J11 M27-J13 M27-J15 M27-J17	N37-J11 N37-J13 N37-J15 N37-J17	W47-J11 W47-J13 W47-J15 W47-J17 W47-J19	GG25-J15	MM33-J15	NN40-J15	WW51-J15	GY25-J15 GY25-J17	MY33-J15	NY40-J15	WY51-J15 WY51-J17
150	H-S	G25-J45 G25-J47	M27-J43 M27-J45 M27-J47	N37-J43 N37-J45 N37-J47	W47-J43 W47-J45 W47-J47	GG25-J45	MM33-J45	NN40-J45	WW51-J45	GY25-J45 GY25-J47	MY33-J45 MY33-J47	NY40-J45	WY51-J43 WY51-J45 WY51-J47
220	H-S	G25-J55	M27-J55 M27-J57	N37-J55 N37-J57	W47-J55								
280	H-S	G25-J63 G25-J65 G25-J67	M27-J63 M27-J65 M27-J67	N37-J63 N37-J65 N37-J67	W47-J63 W47-J65 W47-J67	GG25-J65	MM33-J63 MM33-J65	NN40-J65	WW51-J65	GY25-J65 GY25-J67	MY33-J65 MY33-J67	NY40-J65	WY51-J65 WY51-J67
400	H-S	G25-J85 G25-J87	M27-J85 M27-J87	N37-J85 N37-J87	W47-J83 W47-J85 W47-J87	GG25-J85 GG25-J87	MM33-J85 MM33-J87	NN40-J85 NN40-J87	WW51-J85 WW51-J85	GY25-J85 GY25-J87	MY33-J85 MY33-J87	NY40-J85 NY40-J87	WY51-J85 WY51-J87
500	H-S	G25-J95	M27-J95	N37-J95	W47-J95 W47-J97	GG25-J95	MM33-J95						
600		G25-C05	M27-C05	N37-C05	W47-C05	GG25-C05	MM33-C05	NN40-C05	WW51-C05				

†These stones require Master Holder Sets.
In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. If the stone wears out too fast, use a harder stone; if it does not cut, use a softer stone.

Contact Customer Service for price and availability.

Additional Portable Accessories

Teflon-Mounted Hone Holders for Portable Hones

Used to "finish" oil-free air compressor cylinder sleeves. Provides a "slippery" Teflon coating that is compatible with Teflon rider rings. Made from 15% glass filled Teflon and are used on Sunnen Model AN-112, AN-815, and ANR-275 Portable Hones. (Smaller sizes are available for JN/JNR, and SN/SNR Portable Hones on a special order basis. Call Sunnen Products, Customer Service Department for information.)

These Teflon Hones are used following a 400 grit finishing stone. The recommended procedure when using Teflon stones is to use them dry and with light pressure. Eight full passes up and down the cylinder wall is usually sufficient.

Teflon-Mounted Hone Holders Available

Diameter Range		4 Strips		8 Strips	
mm	in				
64-84	2.5-3.3	GG25-XB25*	GY25-XB25*		
84-107	3.3-4.2	MM33-XB25*	MY33-XB25*		
102-142	4.0-5.6	NN40-XB25*	NY40-XB25*		
114-1524,0	4.5-60	W47-XB25*	WY51-XB25*		

* Special Order - Contact Customer Service

PHT Plateau Honing Tools

For AN, ANR, GNH and GNR Hones

Sunnen's PHT tools are used as a final finishing step, after initial honing to provide a plateau surface on cylinder walls.

For Diameter Range		Abrasive Sets General Purpose 4 Brushes (320 Grit)		Abrasive Sets Production 8 Brushes (320 Grit)	
mm	in				
75,7-96,0	2.98-3.78	GG-PHT-732	GY-PHT-732		
96,0-118,9	3.78-4.68	MM-PHT-731	MY-PHT-731		
113,8-154,4	4.48-6.08	NN-PHT-731	NY-PHT-731		
126,5-1524,0	4.98-60.0	WW-PHT-731	WY-PHT-731		

P-180/P-200

Portable Machine Tooling

I.D. Range:
4,70 mm – 35 mm
.185"–1.375"



P-180 Assembled with BL12 Mandrel Unit

P-180 Honall®

A portable mandrel driver for sizing and finishing holes in work too bulky or heavy to take to the honing machine. Uses the same mandrels and stones used on Sunnen Honing Machines. The adapters listed below must be used as they are different from the adapters used on Sunnen Machines. A quick-release lever retracts the stone and speeds removal of tool from the work. Power source should be a 10 mm (3/8") chuck capacity drill with approximately 350 RPM. Each Honall® is furnished with 7 mm (1/2") and 10 mm (3/8") solid drive shafts and a 10 mm (3/8") drive shaft with build-in universal joint.



P-200 Sidewinder Assembled with K16 Mandrel Unit

P-200 Sidewinder

Similar to the P-180 Honall®, the P200 Sidewinder floats on ball bearings with no universal joint required. Tool does not whip during honing or when removing tool from hole. Ideally suited for short bore honing. Recommended power source is a drill press, milling machine or any other rigid drive unit with a 13 mm (1/2") chuck capacity.

Ordering Information for P-180 Honall® and P-200 Sidewinder

Refer to Section 2 for selection of items 3, 4 and 5.

Order 1-6 For Complete P-180 or P-200 Unit									
Diameter Range 4.70 mm - 35 mm .185" -1.375"		1 Head and Driver	2 Mandrel Adapter				3 Honing Mandrel		
mm	in		K, BL, AK BAL Mandrels	Y Mandrels	For Use with J-K Mandrels	For Use with L Mandrels	When ordering a mandrel in the 4,70-6,22mm (.185"-.245") range add the prefix "S" to the number. SKG-XXXXY. The shank of an SKG mandrel is 25mm (1") shorter than the shank of a standard K6 mandrel. SKG mandrels are available in hard steel only. Mandrels with integral adapters cannot be used with P-180 or P-200. Use GGN-150 Mandrel Driver for applications requiring integral adapter mandrels.		
4,70-6,22	.185-.245	P-180 or P-200	PSK6-A*	NA	NA	NA	4 Truing Sleeve	5 Honing Stones See Stone Tables in Section 2	6 Honing Oil See Section 11 for the correct Honing Oil for your application.
4,70-6,22	.185-.245		PK6-A	NA	LN-3590A	LN-3590A			
6,22-7,82	.245-.308		PK8-A	PK8-A	LN-3608A	LN-3608A			
7,82-9,40	.308-.370		PK10-A	PK10-A	LN-3608A	LN-3608A			
9,40-12,57	.370-.495		PK12-A	PK12-A	LN-3702A	LN-3658A			
12,57-15,72	.495-.619		PK16-A	PK16-A	LN-3703A	LN-3690A			
15,72-18,90	.619-.744		PK20-A	PK20-A	LN-3704A	LN-3692A			
18,90-19,69	.744-.775		PAK20-A	PAK20-A	LN-3704A	LN-3692A			
19,69-26,19	.775-1.031		PAK20-A	PAK20-A	LN-3704A	LN-3692A			
26,19-31,75	1.031-1.250		PAK20-A	PAK20-A	LN-3704A	NA			
31,75-34,93	1.250-1.375		NA	PAK20-A	NA	NA			

* For PSK style mandrels only.



GGN-150 Assembled with 2H-P28-2500WG

GGN-150

Mandrel Driver

I.D. Range:
19 mm – 98 mm
.744"–3.875"

The GGN-150 is a portable mandrel driver for honing larger bores where the hone must be taken to the work. Uses same honing units as Sunnen Honing Machine. Especially designed for holes 19,05 mm (.75") and larger, where the bore length is at least three times the diameter.

Features include spring-loaded adjustable cutting pressure, easy-to-use stone feed-up control, and quick-release lever to retract stone for removal of honing unit from the work. Includes LN-0116A Eccentric Sleeve. Suggested driving power should be at least a 12,7 mm (.5") heavy-duty drill with a 275-450 RPM range.

How to order

For complete honing tool, order:

1. GGN-150 Mandrel Driver (includes one Universal Joint)
2. Order complete Honing Unit as would be required if the job were to be done on a Sunnen Honing Machine. (Refer to Section 2 for tooling.)
3. If GGN-150 is to be used in a rigid stroking device, order additional Universal Joint AN-70.
4. For instant coupling or uncoupling of drive shaft, order Quick Coupler AN-80.

Portahones

Hand-Feed and Remote-Feed Portahones for Portable Use of Machine Tooling

I.D. Range:

18,90 mm – 152,4 mm

.744"–6.000"

Portahones

Portahones are complete portable honing units, ideally suited for honing internal diameters in long tubing, bulky work or other parts too heavy for the honing machine. The Stone and Guide Shoe section is similar to the P20, P28 or the P Mandrels used with the honing machine. However, Portahones are portable tools with a drive shaft, universal joint, stone feed-up mechanism and cutting pressure adjustment. The entire Portahone head and extensions will enter the work piece being honed. Drive shaft extensions make it possible to hone any reasonable bore length. The guide shoes are replaceable on all Portahones assuring long tool life.

Portahones are furnished in two basic configurations:

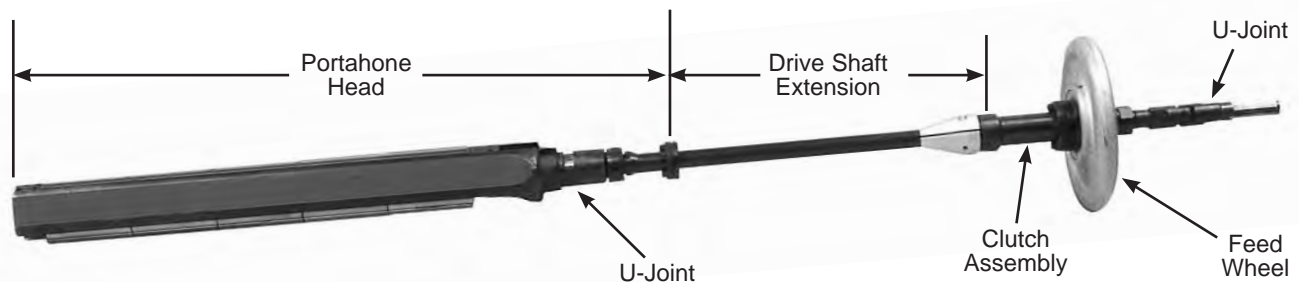
- Remote-Feed
- Hand-Feed

Contact Customer Service for price and availability.

Remote-Feed Portahones: 25,15 - 38,1 mm (.99" - 1.50")

Features a stone feed control which is actuated by a feed wheel located close to the power source. The remote feed allows the operator to expand the stones any time, even while the Portahone is turning or deep in the bore. This design provides for faster stock removal than the hand-feed design by eliminating any need to stop honing for stone adjustment and is necessary for applications having limited access (example: bores located deep in a counterbore).

All drive shaft extensions are installed between the Portahone head and the feed wheel. The feed wheel remains outside the bore being honed, and is always accessible for stone feed. Remote-Feed Portahones are designed for use in a honing rig where both part and driving source are fixed. Two universal joints are supplied with each Remote-Feed Portahone to provide floating action at the honing head. 25,15-152,4 mm (.990"-6.000") Hand-Feed and Remote-Feed Portahones use standard P28/R28 size honing stones and guide shoes found on pages 2.46 - 2.51.



Remote-Feed Portahone

Example: 37,59-41,27mm (1.480"-1.625") 5-Stone Portahone for open hole work with drive shaft extension installed.

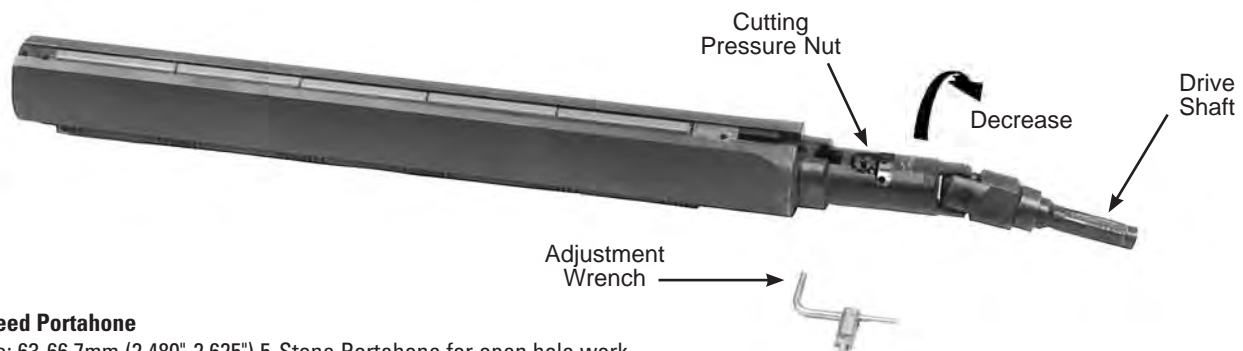
Hand-Feed Portahones: 18,9 - 152,4 mm (.744" - 6.00")

Features a stone feed adjustment located at the Portahone head. An adjustment wrench is provided with each Portahone. The stone adjustment is not accessible when the tool is deep in the bore and the honing operation must be stopped to make the adjustment. At the time the stone adjustment is made, an additional stone feed of up to ,127 mm (.005") may be set into these Portahones. The feed is maintained under tension to compensate for stock removal and stone wear. Portahones

with a range of 66,17 mm (2.605") and larger can be converted at the factory to the remote-feed configuration.

18,90-25,40 mm (.744"-1.000") Hand-Feed Portahones use standard P20 size honing stones and guide shoes found on pages 2.46-2.48.

25,15-152,4 mm (.990"-6.000") Hand-Feed and Remote-Feed Portahones use standard P28-R28 size honing stones and guide shoes found on pages 2.46 - 2.51. Available 4-6 weeks after receipt of order.



Hand-Feed Portahone

Example: 63-66,7mm (2.480"-2.625") 5-Stone Portahone for open hole work.

Portahones

Hand-Feed and Remote-Feed Portahones for Portable Use of Machine Tooling

I.D. Range:

18,90 mm – 25,40 mm

.774"–1.000"

Hand-Feed Portahones

To Order: Specify appropriate part number.

Example: For diameter range 18,9-19,8 mm (.744"-.781"),

3-stone length, specify P3G-P20-750UA Portahone. **This size range is for open holes only.**

Also order required drive shaft extensions from table. Optional Universal Joint and Quick Coupler are listed on page 5.2.

Maximum Reach Length = Length that can be honed without Drive Shaft Extensions (permits overstroke in open holes).

Hand-Feed Portahones

Diameter Range		Part Number		
		3-Stone Length Reach Length 342,90 mm (13.500")	4-Stone Length Reach Length 406,40 mm (16.000")	5-Stone Length Reach Length 469,40 mm (18.500")
18,90-19,83	.744-.781	P3G-P20-750UA	P4G-P20-750UA	—
19,69-20,62	.775-.812	P3G-P20-781UA	P4G-P20-781UA	—
20,47-21,41	.806-.843	P3G-P20-812UB	P4G-P20-812UB	—
21,29-22,22	.838-.875	P3G-P20-843UB	P4G-P20-843UB	—
22,07-23,01	.869-.906	P3G-P20-875UB	P4G-P20-875UB	P5G-P20-875UB
22,86-23,80	.900-.937	P3G-P20-906UC	P4G-P20-906UC	P5G-P20-906UC
23,65-24,59	.931-.968	P3G-P20-937UC	P4G-P20-937UC	P5G-P20-937UC
24,43-25,40	.962-1.000	P3G-P20-968UC	P4G-P20-968UC	P5G-P20-968UC

Drive Shaft Extensions

May be assembled end to end for required length.

Length (Installed)		Part Number
mm	in	
304,8	12	AN-241
609,6	24	AN-242
1219,2	48	AN-244

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MB, & LB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MP3 & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

Portahones

Hand-Feed and Remote-Feed Portahones for Portable Use of Machine Tooling

I.D. Range:

25,15 mm – 38,10 mm

.990"–1.500"

Hand-Feed Portahones

Maximum Reach Length = Length that can be honed without Drive Shaft Extensions (permits overstroke in open holes).

To Order: Select appropriate part number and specify open hole or blind hole.

Example: For diameter range 25,15-27,0 mm (.990"-1.062"), 2-stone length, specify P2G-P28-1000VA Portahone for open hole work. Also order required Drive Shaft Extensions from table at right. Optional Universal Joint and Quick Coupler are listed on page 5.2.

Hand-Feed Portahones

Diameter Range		Part Number				
		2-Stone Length	3-Stone Length	4-Stone Length	5-Stone Length	
		Reach Length 314,33 mm (12.375")	Reach Length 396,88 mm (15.625")	Reach Length 481 mm (18.937")	Reach Length 563,55 mm (22.187")	
mm	in					
25,15-26,97	.990-1.062	P2G-P28-1000VA	P3G-P28-1000VA	P4G-P28-1000VA	P5G-P28-1000VA	
26,72-28,57	1.052-1.125	P2G-P28-1062VA	P3G-P28-1062VA	P4G-P28-1062VA	P5G-P28-1062VA	
28,32-30,15	1.115-1.187	P2G-P28-1125VB	P3G-P28-1125VB	P4G-P28-1125VB	P5G-P28-1125VB	
29,90-31,75	1.177-1.250	P2G-P28-1187VB	P3G-P28-1187VB	P4G-P28-1187VB	P5G-P28-1187VB	
31,24-34,92	1.230-1.375	P2G-P28-1250WB	P3G-P28-1250WB	P4G-P28-1250WB	P5G-P28-1250WB	
34,42-38,10	1.355-1.500	P2G-P28-1375WC	P3G-P28-1375WC	P4G-P28-1375WC	P5G-P28-1375WC	

Drive Shaft Extensions

May be assembled end to end for required length.

Length (Installed)		Part Number
mm	in	
304,8	12	AN-241
609,6	24	AN-242
1219,2	48	AN-244

Remote-Feed Portahones

25,15-38,1 mm (.990"-1.500") Diameter Range

Maximum Reach Length = Length that can be honed without Drive Shaft Extensions (permits overstroke in open holes).

To Order: Select appropriate part number and specify open hole or blind hole.

Example: For diameter range 25,15-27 mm (.990"-1.062"), 3-stone length, specify R3G-P28-1000VA Portahone for open hole work. Also order required Drive Shaft Extensions from table at right. Optional Quick Coupler is listed on page 5.2.

Remote-Feed Portahones*

Diameter Range		Part Number				
		2-Stone Length	3-Stone Length	4-Stone Length	5-Stone Length	
		Reach Length 279,4 mm (11")	Reach Length 362 mm (14.250")	Reach Length 444,5 mm (17.5")	Reach Length 528,6 mm (20.812")	
mm	in					
25,15-26,97	.990-1.062	R2G-P28-1000VA	R3G-P28-1000VA	R4G-P28-1000VA	R5G-P28-1000VA	
26,72-28,57	1.052-1.125	R2G-P28-1062VA	R3G-P28-1062VA	R4G-P28-1062VA	R5G-P28-1062VA	
28,32-30,15	1.115-1.187	R2G-P28-1125VB	R3G-P28-1125VB	R4G-P28-1125VB	R5G-P28-1125VB	
29,90-31,75	1.177-1.250	R2G-P28-1187VB	R3G-P28-1187VB	R4G-P28-1187VB	R5G-P28-1187VB	
31,24-34,92	1.230-1.375	R2G-P28-1250WB	R3G-P28-1250WB	R4G-P28-1250WB	R5G-P28-1250WB	
34,42-38,10	1.355-1.500	R2G-P28-1375WC	R3G-P28-1375WC	R4G-P28-1375WC	R5G-P28-1375WC	

*Complete with drive mechanism and two universal joints.

Note: The Portahone heads from these units may be driven by the drive mechanism (drive shaft and feed-wheel section) of any other Portahone in this group. To purchase a separate head, specify appropriate part number and add "H" to ending suffix. When ordering, specify whether Portahone is for open hole or blind hole work. (Example: R3G-P28-1000VAH Porta-hone Head for open hole work.)

Drive Shaft Extensions

May be assembled end to end for required length.

Length (Installed)		Part Number
mm	in	
304,8	12	LN-7065-12A
609,6	24	LN-7065-24A
914,4	36	LN-7065-36A
1219	48	LN-7065-48A
1524	60	LN-7065-60A
1828	72	LN-7065-72A

Portahones

Hand-Feed and Remote-Feed Portahones for Portable Use of Machine Tooling

I.D. Range:
37,59 mm – 44,45 mm
1.480"–1.750"

Remote-Feed Portahones

Maximum Reach Length = Length that can be honed without Drive Shaft Extensions (permits overstroke in open holes).

To Order: Select appropriate part number and specify open hole or blind hole.

Example: For diameter range 37,6-41,3 mm (1.480"-1.625"), 3-stone length, specify R3G-P28-1500WD Portahone for open hole work. Also order required Drive Shaft Extensions from table at right. Optional Quick Coupler is listed on page 5.2.

Remote-Feed Portahones*

Diameter Range		Part Number			
		2-Stone Length Reach Length 401,6 mm (15.812")	3-Stone Length Reach Length 482,6 mm (19")	4-Stone Length Reach Length 565,15 mm (22.250")	5-Stone Length Reach Length 649,27 mm (25.562")
37,59-41,27	1.480-1.625	R2G-P28-1500WD	R3G-P28-1500WD	R4G-P28-1500WD	R5G-P28-1500WD
40,77-44,45	1.605-1.750	R2G-P28-1625WD	R3G-P28-1625WD	R4G-P28-1625WD	R5G-P28-1625WD

*Complete with drive mechanism and two universal joints.

Note: The Portahone heads from these units may be driven by the drive mechanism (drive shaft and feed-wheel section) of any other Portahone in this group. To purchase a separate head, specify appropriate part number and add "H" to ending suffix. When ordering, specify whether Portahone is for open hole or blind hole work.
(Example: R3G-P28-1000VAH Porta-hone Head for open hole work.)

Drive Shaft Extensions

May be assembled end to end for required length.

Length (Installed)		Part Number
mm	in	
304,8	12	LN-7285-12A
609,6	24	LN-7285-24A
914,4	36	LN-7285-36A
1219	48	LN-7285-48A
1524	60	LN-7285-60A
1828	72	LN-7285-72A

Hand-Feed Portahones

Maximum Reach Length = Length that can be honed without Drive Shaft Extensions (permits overstroke in open holes).

To Order: Select appropriate part number and specify open hole or blind hole.

Example: For diameter range 37,6 – 41,3 mm (1.480"-1.625"), 4-stone length, specify P4G-P28-1500WD Portahone for blind hole work. Also order required Drive Shaft Extensions from table. Optional Universal Joint and Quick Coupler are listed on page 5.2.

Hand-Feed Portahones

Diameter Range		Part Number			
		2-Stone Length Reach Length 352,43 mm (13.875")	3-Stone Length Reach Length 434,98 mm (17.125")	4-Stone Length Reach Length 520,70 mm (20.500")	5-Stone Length Reach Length 603,25 mm (23.750")
37,59-41,27	1.480-1.625	P2G-P28-1500WD	P3G-P28-1500WD	P4G-P28-1500WD	P5G-P28-1500WD
40,77-44,45	1.605-1.750	P2G-P28-1625WD	P3G-P28-1625WD	P4G-P28-1625WD	P5G-P28-1625WD
43,94-47,62	1.730-1.875	P2G-P28-1750WE	P3G-P28-1750WE	P4G-P28-1750WE	P5G-P28-1750WE
47,12-50,80	1.855-2.000	P2H-P28-1875WE	P3H-P28-1875WE	P4H-P28-1875WE	P5H-P28-1875WE
50,29-53,97	1.980-2.125	P2H-P28-2000WF	P3H-P28-2000WF	P4H-P28-2000WF	P5H-P28-2000WF
53,47-57,15	2.105-2.250	P2H-P28-2125WF	P3H-P28-2125WF	P4H-P28-2125WF	P5H-P28-2125WF
56,64-60,32	2.230-2.375	P2H-P28-2250WF	P3H-P28-2250WF	P4H-P28-2250WF	P5H-P28-2250WF
59,82-63,50	2.355-2.500	P2H-P28-2375WG	P3H-P28-2375WG	P4H-P28-2375WG	P5H-P28-2375WG
62,99-66,67	2.480-2.625	P2H-P28-2500WG	P3H-P28-2500WG	P4H-P28-2500WG	P5H-P28-2500WG

Drive Shaft Extensions

May be assembled end to end for required length.

Length (Installed)		Part Number
mm	in	
304,8	12	AN-841
609,6	24	AN-842
1219,2	48	AN-844

Portahones

Hand-Feed and Remote-Feed Portahones for Portable Use of Machine Tooling

I.D. Range:

43,94 mm – 66,68 mm

1.730"–2.625"

Remote-Feed Portahones

Maximum Reach Length = Length that can be honed without Drive Shaft Extensions (permits overstroke in open holes).

To Order: Select appropriate part number and specify open hole or blind hole.

Example: For diameter range 43,94-47,62 mm (1.730"-1.875"), 3-stone length, specify R3G-P28-1750WE
Portahone for open hole work. Also order required Drive Shaft Extensions from table.
Optional Quick Coupler is listed on page 5.2.

Remote-Feed Portahones*

Diameter Range		Part Number			
		2-Stone Length	3-Stone Length	4-Stone Length	5-Stone Length
mm	in	Reach Length 401,6 mm (15.812")	Reach Length 482,6 mm (19")	Reach Length 565,15 mm (22.250")	Reach Length 649,27 mm (25.562")
43,94-47,62	1.730-1.875	R2G-P28-1750WE	R3G-P28-1750WE	R4G-P28-1750WE	R5G-P28-1750WE
47,12-50,80	1.855-2.000	R2H-P28-1875WE	R3H-P28-1875WE	R4H-P28-1875WE	R5H-P28-1875WE
50,29-53,97	1.980-2.125	R2H-P28-2000WF	R3H-P28-2000WF	R4H-P28-2000WF	R5H-P28-2000WF
53,47-57,15	2.105-2.250	R2H-P28-2125WF	R3H-P28-2125WF	R4H-P28-2125WF	R5H-P28-2125WF
56,64-60,32	2.230-2.375	R2H-P28-2250WF	R3H-P28-2250WF	R4H-P28-2250WF	R5H-P28-2250WF
59,82-63,50	2.355-2.500	R2H-P28-2375WG	R3H-P28-2375WG	R4H-P28-2375WG	R5H-P28-2375WG
62,99-66,67	2.480-2.625	R2H-P28-2500WG	R3H-P28-2500WG	R4H-P28-2500WG	R5H-P28-2500WG

*Complete with drive mechanism and two universal joints.

Note: The Portahone heads from these units may be driven by the drive mechanism (drive shaft and feed-wheel section) of any other Portahone in this group. To purchase a separate head, specify appropriate part number and add "H" to ending suffix. When ordering, specify whether Portahone is for open hole or blind hole work.
(Example: R3G-P28-1000VAH Porta-hone Head for open hole work.)

Drive Shaft Extensions

May be assembled end to end for required length.

Length (Installed)		Part Number
mm	in	
304,8	12	JNR-441
609,6	24	JNR-442
914,4	36	JNR-443
1219	48	JNR-444
1524	60	JNR-445
1828	72	JNR-446

Portahones

Hand-Feed and Remote-Feed Portahones for Portable Use of Machine Tooling

I.D. Range:
66,17 mm – 152,4 mm
2.605"–6.000"

Hand-Feed Portahones

Maximum Reach Length = Length that can be honed without Drive Shaft Extensions (permits overstroke in open holes).

To Order: Specify appropriate part number indicating whether for open hole or blind hole.

Example: For diameter range 66,2-69,9 mm (2.605"-2.750"), 3-stone length, specify P3K-P28-2625SC Portahone for open hole work. Also order required Drive Shaft Extensions from table. Optional Universal Joint and Quick Coupler is listed on page 5.2.

Diameter Range		Part Number			
mm	in	2-Stone Length	3-Stone Length	4-Stone Length	5-Stone Length
		Reach Length 355,6 mm (14")	Reach Length 439,72 mm (17.312")	Reach Length 520,70 mm (20.5")	Reach Length 603,25 mm (23.750")
66,17-69,85	2.605-2.750	P2K-P28-2625SC	P3K-P28-2625SC	P4K-P28-2625SC	P5K-P28-2625SC
69,34-73,02	2.730-2.875	P2K-P28-2750SC	P3K-P28-2750SC	P4K-P28-2750SC	P5K-P28-2750SC
72,52-76,20	2.855-3.000	P2K-P28-2875SC	P3K-P28-2875SC	P4K-P28-2875SC	P5K-P28-2875SC
75,69-79,37	2.980-3.125	P2K-P28-3000SC	P3K-P28-3000SC	P4K-P28-3000SC	P5K-P28-3000SC
78,87-82,55	3.105-3.250	P2K-P28-3125SD	P3K-P28-3125SD	P4K-P28-3125SD	P5K-P28-3125SD
82,04-85,72	3.230-3.375	P2K-P28-3250SD	P3K-P28-3250SD	P4K-P28-3250SD	P5K-P28-3250SD
85,22-88,90	3.355-3.500	P2K-P28-3375SD	P3K-P28-3375SD	P4K-P28-3375SD	P5K-P28-3375SD
88,39-92,07	3.480-3.625	P2K-P28-3500SD	P3K-P28-3500SD	P4K-P28-3500SD	P5K-P28-3500SD
91,57-95,25	3.605-3.750	P2K-P28-3625SD	P3K-P28-3625SD	P4K-P28-3625SD	P5K-P28-3625SD
94,74-98,43	3.730-3.875	P2K-P28-3750SD	P3K-P28-3750SD	P4K-P28-3750SD	P5K-P28-3750SD
97,92-101,60	3.855-4.000	P2K-P28-3875SD	P3K-P28-3875SD	P4K-P28-3875SD	P5K-P28-3875SD
101,09-104,78	3.980-4.125	P2K-P28-4000SD	P3K-P28-4000SD	P4K-P28-4000SD	P5K-P28-4000SD
104,27-107,95	4.105-4.250	P2K-P28-4125SD	P3K-P28-4125SD	P4K-P28-4125SD	P5K-P28-4125SD
107,44-111,13	4.230-4.375	P2K-P28-4250SD	P3K-P28-4250SD	P4K-P28-4250SD	P5K-P28-4250SD
110,62-114,30	4.355-4.500	P2K-P28-4375SD	P3K-P28-4375SD	P4K-P28-4375SD	P5K-P28-4375SD
113,79-117,48	4.480-4.625	P2K-P28-4500SD	P3K-P28-4500SD	P4K-P28-4500SD	P5K-P28-4500SD
116,97-120,65	4.605-4.750	P2K-P28-4625SD	P3K-P28-4625SD	P4K-P28-4625SD	P5K-P28-4625SD
120,14-123,83	4.730-4.875	P2K-P28-4750SD	P3K-P28-4750SD	P4K-P28-4750SD	P5K-P28-4750SD
123,32-127,00	4.855-5.000	P2K-P28-4875SD	P3K-P28-4875SD	P4K-P28-4875SD	P5K-P28-4875SD
126,49-130,18	4.980-5.125	P2K-P28-5000SD	P3K-P28-5000SD	P4K-P28-5000SD	P5K-P28-5000SD
129,67-133,35	5.105-5.250	P2K-P28-5125SD	P3K-P28-5125SD	P4K-P28-5125SD	P5K-P28-5125SD
132,84-136,53	5.230-5.375	P2K-P28-5250SD	P3K-P28-5250SD	P4K-P28-5250SD	P5K-P28-5250SD
136,02-139,70	5.355-5.500	P2K-P28-5375SD	P3K-P28-5375SD	P4K-P28-5375SD	P5K-P28-5375SD
139,19-142,88	5.480-5.625	P2K-P28-5500SD	P3K-P28-5500SD	P4K-P28-5500SD	P5K-P28-5500SD
142,37-146,05	5.605-5.750	P2K-P28-5625SD	P3K-P28-5625SD	P4K-P28-5625SD	P5K-P28-5625SD
145,54-149,23	5.730-5.875	P2K-P28-5750SD	P3K-P28-5750SD	P4K-P28-5750SD	P5K-P28-5750SD
148,72-152,40	5.855-6.000	P2K-P28-5875SD	P3K-P28-5875SD	P4K-P28-5875SD	P5K-P28-5875SD

*Complete with drive mechanism and two universal joints.

Honing Stones and Guide Shoes:

18,90-25,40 mm (.744"-1.000") Hand-Feed Portahones use standard P20 size honing stones and Guide Shoes found on pages 2.42-2.45.

25,15-152,4 mm (.990"-6.000") Hand-Feed and Remote-Feed Portahones use standard P28 or R28 blind hole honing stones and Guide Shoes found on pages 2.46-2.51.

Portahones 66,68 mm (2.625") and larger require two Guide Shoes for each stone used in the Portahone.

Drive Shaft Extensions

May be assembled end to end for required length.

Length (Installed)		Part Number
mm	in	
304,8	12	AN-841
609,6	24	AN-842
1219,2	48	AN-844

Portahones

Hand-Feed and Remote-Feed Portahones for Portable Use of Machine Tooling

I.D. Range:

66,17 mm – 152,4 mm

2.605"–6.000"

Remote-Feed Portahones

Maximum Reach Length = Length that can be honed without Drive Shaft Extensions (permits overstroke in open holes).

To Order: Select appropriate part number and specify open hole or blind hole.

Example: For diameter range 66,17-69,9 mm (2.605"-2.750"), 4-stone length, specify R4K-P28-2625SC Portahone for open hole work. Also order required Drive Shaft Extensions from table. Optional Quick Coupler is listed on page 5.2.

Remote-Feed Portahones*

Diameter Range		Part Number			
		2-Stone Length	3-Stone Length	4-Stone Length	5-Stone Length
mm	inches	Reach Length 343 mm (13.500")	Reach Length 425,5 mm (16.750")	Reach Length 511,18 mm (20.125")	Reach Length 593,73 mm (23.375")
66,17-69,85	2.605-2.750	R2K-P28-2625SC	R3K-P28-2625SC	R4K-P28-2625SC	R5K-P28-2625SC
69,34-73,02	2.730-2.875	R2K-P28-2750SC	R3K-P28-2750SC	R4K-P28-2750SC	R5K-P28-2750SC
72,52-76,20	2.855-3.000	R2K-P28-2875SC	R3K-P28-2875SC	R4K-P28-2875SC	R5K-P28-2875SC
75,69-79,37	2.980-3.125	R2K-P28-3000SC	R3K-P28-3000SC	R4K-P28-3000SC	R5K-P28-3000SC
78,87-82,55	3.105-3.250	R2K-P28-3125SD	R3K-P28-3125SD	R4K-P28-3125SD	R5K-P28-3125SD
82,04-85,72	3.230-3.375	R2K-P28-3250SD	R3K-P28-3250SD	R4K-P28-3250SD	R5K-P28-3250SD
85,22-88,90	3.355-3.500	R2K-P28-3375SD	R3K-P28-3375SD	R4K-P28-3375SD	R5K-P28-3375SD
88,39-92,07	3.480-3.625	R2K-P28-3500SD	R3K-P28-3500SD	R4K-P28-3500SD	R5K-P28-3500SD
91,57-95,25	3.605-3.750	R2K-P28-3625SD	R3K-P28-3625SD	R4K-P28-3625SD	R5K-P28-3625SD
94,74-98,43	3.730-3.875	R2K-P28-3750SD	R3K-P28-3750SD	R4K-P28-3750SD	R5K-P28-3750SD
97,92-101,60	3.855-4.000	R2K-P28-3875SD	R3K-P28-3875SD	R4K-P28-3875SD	R5K-P28-3875SD
101,09-104,78	3.980-4.125	R2K-P28-4000SD	R3K-P28-4000SD	R4K-P28-4000SD	R5K-P28-4000SD
104,27-107,95	4.105-4.250	R2K-P28-4125SD	R3K-P28-4125SD	R4K-P28-4125SD	R5K-P28-4125SD
107,44-111,13	4.230-4.375	R2K-P28-4250SD	R3K-P28-4250SD	R4K-P28-4250SD	R5K-P28-4250SD
110,62-114,30	4.355-4.500	R2K-P28-4375SD	R3K-P28-4375SD	R4K-P28-4375SD	R5K-P28-4375SD
113,79-117,48	4.480-4.625	R2K-P28-4500SD	R3K-P28-4500SD	R4K-P28-4500SD	R5K-P28-4500SD
116,97-120,65	4.605-4.750	R2K-P28-4625SD	R3K-P28-4625SD	R4K-P28-4625SD	R5K-P28-4625SD
120,14-123,83	4.730-4.875	R2K-P28-4750SD	R3K-P28-4750SD	R4K-P28-4750SD	R5K-P28-4750SD
123,32-127,00	4.855-5.000	R2K-P28-4875SD	R3K-P28-4875SD	R4K-P28-4875SD	R5K-P28-4875SD
126,49-130,18	4.980-5.125	R2K-P28-5000SD	R3K-P28-5000SD	R4K-P28-5000SD	R5K-P28-5000SD
129,67-133,35	5.105-5.250	R2K-P28-5125SD	R3K-P28-5125SD	R4K-P28-5125SD	R5K-P28-5125SD
132,84-136,53	5.230-5.375	R2K-P28-5250SD	R3K-P28-5250SD	R4K-P28-5250SD	R5K-P28-5250SD
136,02-139,70	5.355-5.500	R2K-P28-5375SD	R3K-P28-5375SD	R4K-P28-5375SD	R5K-P28-5375SD
139,19-142,88	5.480-5.625	R2K-P28-5500SD	R3K-P28-5500SD	R4K-P28-5500SD	R5K-P28-5500SD
142,37-146,05	5.605-5.750	R2K-P28-5625SD	R3K-P28-5625SD	R4K-P28-5625SD	R5K-P28-5625SD
145,54-149,23	5.730-5.875	R2K-P28-5750SD	R3K-P28-5750SD	R4K-P28-5750SD	R5K-P28-5750SD
148,72-152,40	5.855-6.000	R2K-P28-5875SD	R3K-P28-5875SD	R4K-P28-5875SD	R5K-P28-5875SD

*Complete with drive mechanism and two universal joints.

Note: The Portahone heads from these units may be driven by the drive mechanism (drive shaft and feed-wheel section) of any other Portahone in this group. To purchase a separate head, specify appropriate part number and add "H" to ending suffix indicating open hole or blind hole work.
(Example: RHK-P28-2625SCH Portahone Head for open hole work.)

Honing Stones and Guide Shoes:

18,90-25,40 mm (.744"-1.000") Hand-Feed Portahones use standard P20 size honing stones and Guide Shoes found on pages 2.42-2.45.

25,15-152,4 mm (.990"-6.000") Hand-Feed and Remote-Feed Portahones use standard P28 or R28 blind hole honing stones and Guide Shoes found on pages 2.46-2.51.

Portahones 66,68 mm (2.625") and larger require two Guide Shoes for each stone used in the Portahone.

Drive Shaft Extensions

May be assembled end to end for required length.

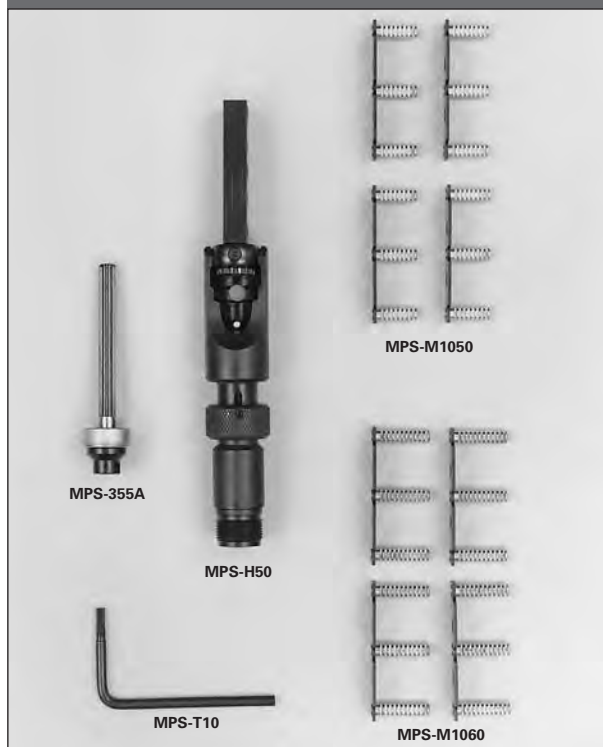
Length (Installed)		Part Number
mm	in	
235	9-1/4	ANR-741
482	19	ANR-742
1086	42-1/4	ANR-744
1835	72-1/4	ANR-746

MPS Modular Tool System

HT/HL/STH - Type Systems

Diameter Range:
50 mm — 76 mm (1.98"-3.0")

MPS-H50 Hone Head Module



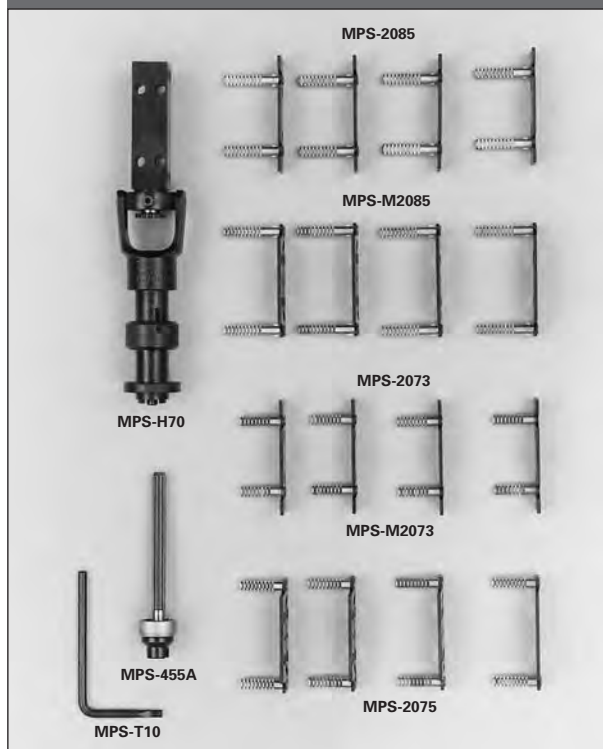
Part Number	Description
MPS-H50	Hone Head Assembly includes:
MPS-355A	Pinion Adjustment Assembly
MPS-57A	Body Gear (Not shown)
ANR-170A	Inner Feed Assembly (Not shown)
MPS-285A	Drive Shaft End and Yoke (Not shown)
MPS-M1050	Master Stoneholder Sets (2 per set) Diameter Range: 50-61 mm (2.0"-2.375")
MPS-M1060	Master Stoneholder Sets (2 per set) Diameter Range: 61-76 mm (2.375"-3.0")
MPS-T10	Swaging Tool

Order stones from the H50 Stone Selection Guide found on page 5.29.

Double length Hone Heads available as a special. Contact Customer Service.

Diameter Range:
73 mm — 111 mm (2.9"-4.4")

MPS-H70 Hone Head Module



Part Number	Description
MPS-H70	Hone Head Assembly includes:
MPS-455A	Pinion Adjustment Assembly
MPS-57A	Body Gear (Not shown)
MPS-79A	Pins (Not shown)
ANR-170A	Inner Feed Assembly (Not shown)
MPS-M2073	Master Stoneholder Set (2 per set) Diameter Range: 73-89 mm (2.9"-3.5") includes:
MPS-2073	Stone Master Holder Assembly
MPS-2075	Guide Master Holder Assembly
MPS-M2085	Master Stoneholder Set (2 per set) Diameter Range: 87-111 mm (3.4"-4.4") includes:
MPS-2085	Stone Master Holder Assembly
MPS-2090	Guide Master Holder Assembly
MPS-T10	Swaging Tool

Order stones from the H70 Stone Selection Guide found on page 5.29.

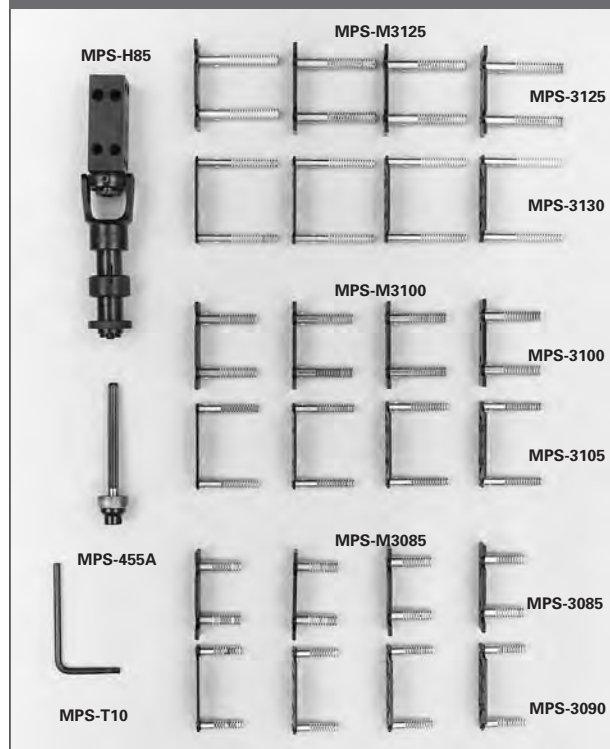
Double length Hone Heads available as a special. Contact Customer Service.

MPS Modular Tool System

HT/HL/STH - Type Systems

Diameter Range:
85 mm — 177 mm (3.4"-7.0")

MPS-H85 Hone Head Module



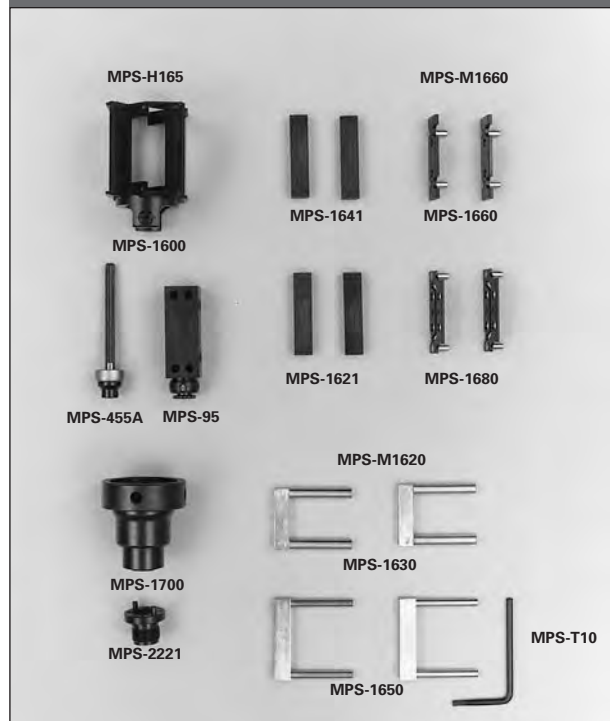
Part Number	Description
MPS-H85	Hone Head Assembly includes:
MPS-455A	Pinion Adjustment Assembly
MPS-57A	Body Gear (Not shown)
MPS-79A	Pins (Not shown)
ANR-170A	Inner Feed Assembly (Not shown)
MPS-M3085	Master Stoneholder Set (2 per set) Diameter Range: 86,4-111,8 mm (3.4"-4.4") includes:
MPS-3085	Stone Master Holder
MPS-3090	Guide Master Holder
MPS-M3100	Master Stoneholder Set (2 per set) Diameter Range: 101,6-139,7 mm (4.0"-5.5") includes:
MPS-3100	Stone Master Holder
MPS-3105	Guide Master Holder
MPS-M3125	Master Stoneholder Set (2 per set) Diameter Range: 127-177,8 mm (5.0"-7.0") includes:
MPS-3125	Stone Master Holder
MPS-3130	Guide Master Holder
MPS-T10	Swaging Tool

Order stones from the H70 Stone Selection Guide found on page 5.29.

Double length Hone Heads available as a special. Contact Customer Service.

Diameter Range:
165 mm — 216 mm (6.5"-8.5")

MPS-H165 Hone Head Module



Part Number	Description
MPS-H165	Hone Head Assembly includes:
MPS-1700A	Yoke Assembly
MPS-1600	Cage Assembly
MPS-95A	Hone Body Assembly includes:
MPS-57A	Body Gear (Not shown)
MPS-79A	Pin (Not shown)
MPS-2221A	Output Drive Adapter
MPS-455A	Pinion Adjustment Assembly
MPS-M1620	Stone and Guide Adapter Set includes:
MPS-1630	Stone Extension Support (2 per set)
MPS-1650	Guide Extension Support (2 per set)
MPS-1621	Stone Adapter Block (2 per set)
MPS-1641	Guide Adapter Block (2 per set)
MPS-M1660	Stone and Guide Adapter Set includes:
MPS-1660	Stone Master Holder Assembly (2 per set)
MPS-1680	Guide Master Holder Assembly (2 per set)
MPS-T10	Swaging Tool

Order stones from the H70 Stone Selection Guide found on page 5.29.

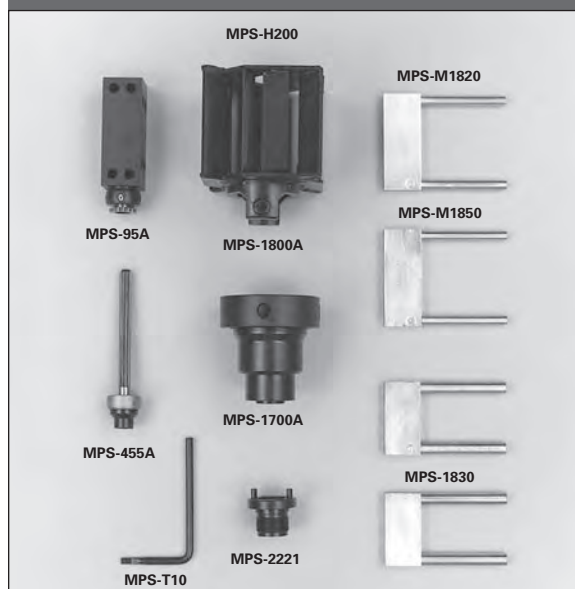
Double length Hone Heads available as a special. Contact Customer Service.

MPS Modular Tool System

HT/HL/STH - Type Systems

Diameter Range:
203 mm — 299 mm (8"-11.5")

MPS-H200 Hone Head Module*



Part Number	Description
MPS-H200	Hone Head Assembly includes:
MPS-1700A	Yoke Assembly
MPS-1800A	Cage Assembly
MPS-95A	Hone Body Assembly includes:
MPS-57A	Body Gear (Not shown)
MPS-79A	Pin (Not shown)
MPS-2221A	Output Drive Adapter
MPS-455A	Pinion Adjustment Assembly
MPS-M1820	Stone and Guide Extension Set includes:
MPS-1850	Guide Extension Support Assembly (2 per set)
MPS-1830	Stone Extension Support Assembly (2 per set)
MPS-T10	Swaging Tool

Order stones from the H70 Stone Selection Guide found on page 5.29.

* Order single length or double length Master Holder and Adapter Block Sets for MPS-H200 Hone Head separately.

For larger diameter MPS style hone heads, request product bulletin P-39071.

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MBB, & LBB)

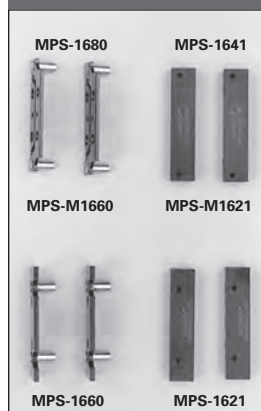
PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MPS & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

MPS-M1870 Single Length Stone and Guide Master Holder and Adapter Block Set



Part Number	Description
MPS-M1621	Single Length Adapter Block Set (1 per set) includes:
MPS-1641	Guide Adapter Block (2 per set)
MPS-1621	Stone Adapter Block (2 per set)
MPS-M1660	Stone and Guide Master Holder Set (1 per set) includes:
MPS-1680	Guide Master Holder Set (2 per set)
MPS-1660	Stone Master Holder Set (2 per set)

JS9X Cage Assembly and Stone and Guide Extension Set for the MPS System

Diameter Range 279,4 m-381,0 mm (11.0"-15.0")
Increases the diameter range of the MPS-H165 and MPS-H200 hone head modules to 279,4 mm-381,0 mm (11"-15"). Customers who currently have an MPS-H165 or MPS-H200 hone head need to order the following:

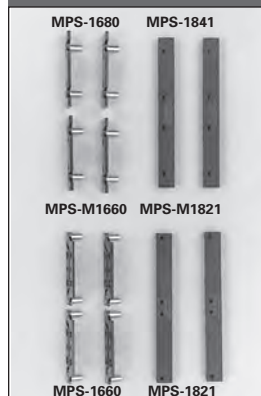
JS9X-1	Cage Assembly
JS9X-45	Stone and Guide Extension Set

For customers who do not have an MPS-H165 or MPS-H200 the following items need to be ordered for a complete unit.

MPS-1700A	Yoke Assembly
MPS-95A	Hone Body Assembly
MPS-455A	Pinion Adjustment Assembly
MPS-M1870	Single Length Stone and Guide Master Holder and Adapter Block Set or
MPS-M1880	Double Length Stone and Guide Master Holder and Adapter Block Set

Order stones from H70 Stone Selection Guide found on page 5.29.

MPS-M1880 Double Length Stone and Guide Master Holder and Adapter Block Set



Part Number	Description
MPS-M1821	Double Length Adapter Block Set (1 per set) includes:
MPS-1841	Guide Adapter Block (2 per set)
MPS-1821	Stone Adapter Block (2 per set)
MPS-M1660	Stone and Guide Master Holder Set (2 per set) includes:
MPS-1680	Guide Master Holder Set (4 per set)
MPS-1660	Stone Master Holder Set (4 per set)

MPS Modular Tool System

NH6X Cage Assembly and Stone and Guide Extension Set for the MPS System

Diameter Range 381,0mm-889,0mm (15"-35")

Increases the diameter range of the MPS-H165 and MPS-H200 hone head modules to 381,0mm-889,0mm (15"-35"). Customers who currently have a MPS-H165 or MPS-H200 hone head need to order the following:

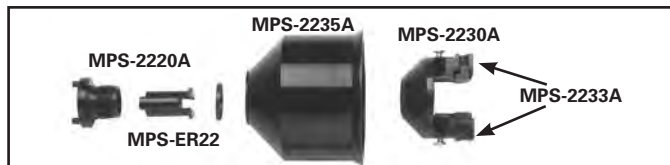
Diameter Range:	Cage	Stone and Guide Extensions
381mm-508mm(15"-20")	NH6X-1520-1	NH6X-1520-45
508mm-635mm(20"-25")	NH6X-2025-1	NH6X-2025-45
635mm-762mm(25"-30")	NH6X-2530-1	NH6X-2530-45
762mm-889mm(30"-35")	NH6X-3035-1	NH6X-3035-45

For customers who do not have an MPS-H165 or MPS-H200 the following items need to be ordered for a complete unit.

- 1.) 381mm-508mm (15"-20") NH6X-1520
508mm-635mm (20"-25") NH6X-2025
635mm-762mm (25"-30") NH6X-2530
762mm-889mm (30"-35") NH6X-3035
- 2.) MPS-1700A Yoke Assembly
- 3.) PHS-633 Screws (4 Req.)
PG-587A Washers (4 Req.)
MPS-1608 Spacers (2 Req.)
- 4.) Stone and guide master holder and adapter block sets must be ordered separately. MPS-M1870 Single Length or MPS M1880 Double Length)

Adapter Sets

For use with Drive and Feed Extensions

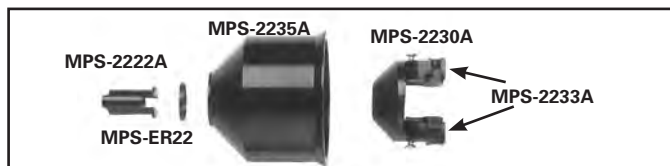


MPS-2200 Adapter Set

For use with MPS-H70 and MPS-H85 Hone Head Modules and MPS-1000JU5X Mandrel Driver.

Replacement Parts for Adapter Set

MPS-2220A	Output Flange
MPS-2230A	Input Yoke
MPS-2235A	Universal Cover
MPS-2232A	Trip Dogs (Package of 2) (Not shown)
MPS-2233A	Pins (Package of 2)
MPS-ER22	Disassembly Rings (Package of 6)



MPS-2201 Adapter Set

For use with MPS-H50, MPS-H165 and MPS-H200 Hone Head Modules.

Replacement Parts for Adapter Set

MPS-2230A	Input Yoke
MPS-2235A	Universal Cover
MPS-2222A	Output Feed Adapter
MPS-2232A	Trip Dogs (Package of 2) (Not shown)
MPS-2233A	Pins (Package of 2)
MPS-ER22	Disassembly Rings (Package of 6)

Drive and Feed Extensions for H50, H70, H85, H165 and H200 Hone Head Modules

Select proper Drive and Feed Extension(s) for your application from the following:

- MPS-E2015†** Length 150 mm (5.9")
For honing lengths up to 406 mm (16")
Shipping Weight: 1,1 kg (2.5 lbs.)
- MPS-E2040†** Length 399 mm (15.7")
For honing lengths up to 660 mm (26")
Shipping Weight: 1,6 kg (3.5 lbs.)
- MPS-E2100†** Length 998 mm (39.3")
For honing lengths up to 1244 mm (49")
Shipping Weight: 3,0 kg (6.5 lbs.)
- MPS-E2160†** Length 1600 mm (63")
For honing lengths up to 1844 mm (73")
Shipping Weight: 4,0 kg (8.8 lbs.)
- MPS-E2175†** Length 1750 mm (68.9")
For honing lengths up to 1981 mm (78")
Shipping Weight: 4,5 kg (10 lbs.)

MPS Drive Tubes can easily be connected when honing lengths longer than 1981 mm (78").

† Each Drive & Feed Extension comes with two Disassembly Rings. Should additional rings be required order the following Part Number: **MPS-ER22** Disassembly Rings (package of 6).



Drive Shafts can be bolted together by ordering one each of the following per Drive Shaft ordered.

MPS-2211A Input Drive Adapter
MPS-2212A Input Feed Adapter
MPS-2221A Output Drive Adapter
MPS-2222A Output Feed Adapter

GNR Drive Shaft Adapters for "Heavy Duty" Applications



These adapters allow GNR Drive Shaft Extensions to be used in place of MPS Drive Shaft Extensions in diameter 88,9 mm (3.50") and larger. The GNR Drive Shaft Extensions are stronger than MPS Drive Shaft Extensions and should be used in more demanding applications.

When ordering adapters for standard MPS tooling above 88,9 mm (3.50") order the following two items:

MPS-1720A Input Adapter and **MPS-1740A** Output Adapter

(Order (1) MPS-2211A Input Drive Adapter and (1) MPS-2212A Input Feed Adapter when Drive Shaft Adapters are to be used with MPS-H165 or MPS-H200 hone heads.)

When ordering adapters for GNR drive shafts and standard MPS tooling above 88.9 (3.50") Order the following items:

MPS-1720A Input Adapter
MPS-1740A Output Adapter
(This tooling combination is recommended for rough, out-of-round holes, large diameters, or heavy duty applications.)

When quick change-over of hone heads is desired order:

MPS-2211A Input Adapter
MPS-2212A Feed Adapter

These components allow for the drive shaft and hone head to be easily unbolted from each other. (Not recommended for rough, out-of-round holes, large diameters, or heavy duty applications.)

MPS Modular Tool System

For HT/HL/STH - Type Systems

Stone and Guide Sets

H50 Stone Sets for use with MPS-H50 Hone Head

Each set consists of two stone assemblies.

Stones in parentheses available 2 weeks after receipt of order.

	Grit Size						
	70	80	150	220	280	400	500 600
Hard-----Soft	Abrasive Type Aluminum Oxide Stones (A)						
		H50-A25	H50-A43 H50-A44N H50-A45 H50-A45N H50-A47 H50-A49		H50-A65 H50-A67		
Hard-----Soft	Abrasive Type Silicon Carbide Stones (J,C)						
			H50-J45		H50-J65 H50-J67	H50-J85 H50-J87	H50-J95 H50-J97 H50-C05

H70 Stone and Guide Set for use with MPS-H70, MPS-H85, MPS-H165 and MPS-H200 Hone Heads

Each set consists of two stone assemblies and two guides.

Contact Customer Service for price and availability.

	Grit Size						
	70	80	150	220	280	400	500 600
Hard-----Soft	Abrasive Type Aluminum Oxide Stones (A)						
		H70-A23 H70-A25 H70-A25N H70-A27	H70-A43 H70-A45 H70-A45N H70-A47 H70-A49		H70-A63 H70-A65 H70-A67		
Hard-----Soft	Abrasive Type Silicon Carbide Stones (J,C)						
	H70-J13 H70-J15		H70-J43 H70-J45 H70-J47		H70-J63 H70-J65 H70-J67	H70-J85 H70-J87	H70-J95 H70-J97 H70-C05

Miscellaneous Accessories & Tooling

MPS-1000-JU5X Mandrel Driver

For honing bores with interruptions, cross holes, undercuts which standard MPS tools will not bridge. MPS-1000-JU5X adapts to the MPS drive and feed extensions and can be used with standard P28/R28 tooling for the diameter range of 66 mm – 144 mm (2-5/16"-6"), where the mandrel driver has to enter the part. (Smaller mandrels may be used if the mandrel driver does not have to enter the part.)

Order mandrels and stones from the P28/R28 section on pages 2.46-2.51.

MPS-1000-JU5X available 4 weeks after receipt of order.



H50 and H70 Metal Bond

Superabrasive Stone Sets

H50 and H70 Metal Bond Superabrasive Stone Sets are available for use on MPS-H50, MPS-H70, MPS-H85, MPS-H165, MPS-H200 and MPS-H200 with JS9X Extension Sets.

	Grit Size						
	70	100	150	220	400	600	1200
S-H	Abrasive Type Diamond (D)						
		H50-DM37 H50-DM39		H50-DM57	H50-DM85 H50-DM87	H50-DM05	H50-DM005
S-H	Abrasive Type CBN (N)						
	H50-NM15 H50-NM17	H50-NM35 H50-NM37		H50-NM55 H50-NM57	H50-NM85	H50-NM05	H50-NM005

	Grit Size						
	70	100	150	220	400	600	1200
S-H	Abrasive Type Diamond (D)						
	H70-DM17	H70-DM35 H70-DM37 H70-DM39	H70-DM45 H70-DM47	H70-DM55 H70-DM57	H70-DM85 H70-DM87	H70-DM05 H70-DM07	H70-DM005
S-H	Abrasive Type CBN (N)						
	H70-NM15 H70-NM17 H70-NM39	H70-NM35 H70-NM37	H70-NM47	H70-NM55 H70-NM57	H70-NM85	H70-NM05	H70-NM005

SC-B-HL Heavy-Duty Bronze Guide Shoe

For use with H70 Diamond or CBN Honing Stones when standard guide shoes wear excessively. Also used for special finishing applications. (2 required per stone set used.)

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MB, & LBB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-A10 & SV-10 MACHINES)

PORTABLE, MPS & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

MPS Modular Tool System

MPS Portahones and Drive Extensions

Diameter Range:

25,15 mm — 66,68 mm (.990"-2.625")

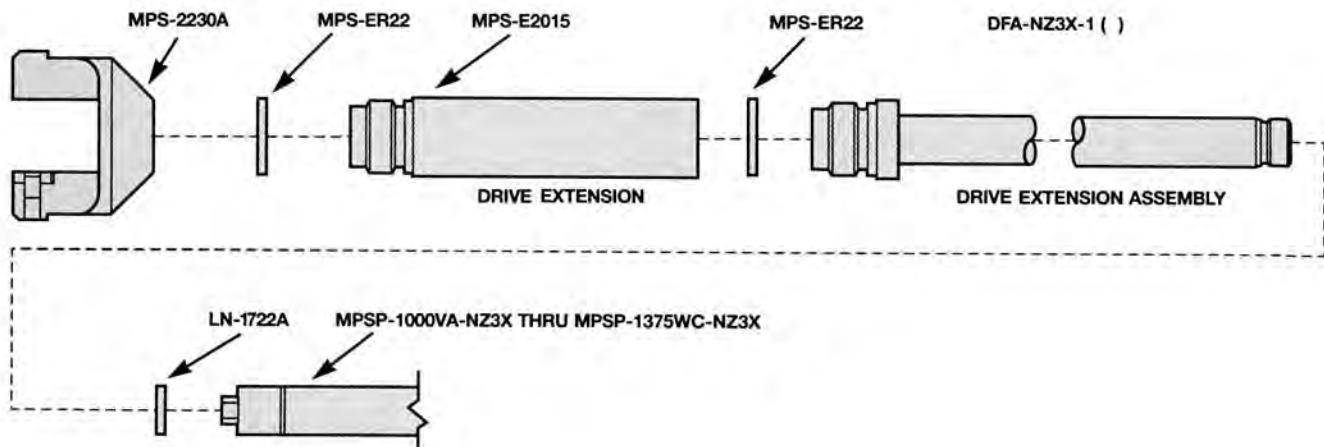
Portahones are to be used in applications below the MPS-H50 Hone Head diameter range or in situations where longer stone length is required to bridge ports or other interruptions that cannot be bridged with H50 length stones. (For applications where longer stone length is required in diameters larger than 66,68 mm [2.625"] use MPS-1000-JU5X with standard P28 mandrels.) All Portahones use standard P28 or R28 stones and guide shoes. (See pages 2.46-2.51 for Stone and Guide Shoe Selection.)

This style of Portahone is specifically designed for use in MPS applications. They incorporate all the features of standard portahones, but are used with drive tube extensions that are more suited for "power" honing.

Available 4-6 weeks after receipt of order.

For special application hone heads down to 1/2", contact your Sunnen sales representative for additional information.

Diameter Range: 25,15 mm – 38,1 mm (.990"-1.500")



Open Hole: Order 1, 2, 4, 5, 6 For Complete MPS Honing Unit

Blind Hole: Order 1, 3, 4, 5, 6 For Complete MPS Honing Unit

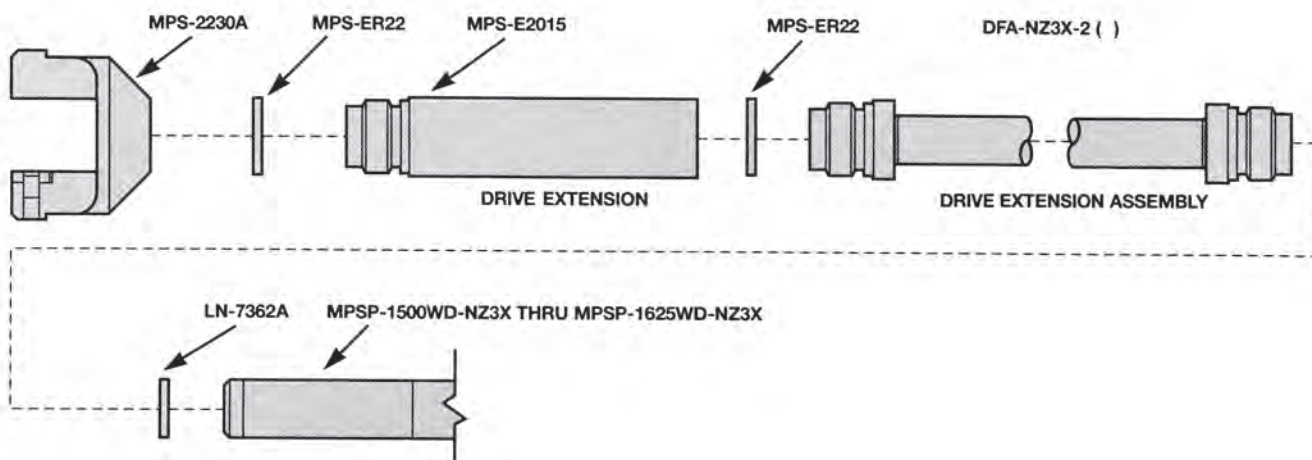
1 Mandrel Number	Diameter Range		2-Stone	3-Stone	4-Stone	5-Stone*
	mm	in				
1	25,15-26,97	.990-1.062	2-MPSP-1000VA-NZ3X	3-MPSP-1000VA-NZ3X	4-MPSP-1000VA-NZ3X	5-MPSP-1000VA-NZ3X
	26,72-28,58	1.052-1.125	2-MPSP-1062VA-NZ3X	3-MPSP-1062VA-NZ3X	4-MPSP-1062VA-NZ3X	5-MPSP-1062VA-NZ3X
	28,32-30,15	1.115-1.187	2-MPSP-1125VB-NZ3X	3-MPSP-1125VB-NZ3X	4-MPSP-1125VB-NZ3X	5-MPSP-1125VB-NZ3X
	29,90-31,75	1.177-1.250	2-MPSP-1187VB-NZ3X	3-MPSP-1187VB-NZ3X	4-MPSP-1187VB-NZ3X	5-MPSP-1187VB-NZ3X
	31,24-34,93	1.230-1.375	2-MPSP-1250WB-NZ3X	3-MPSP-1250WB-NZ3X	4-MPSP-1250WB-NZ3X	5-MPSP-1250WB-NZ3X
	34,40-38,10	1.355-1.500	2-MPSP-1375WC-NZ3X	3-MPSP-1375WC-NZ3X	4-MPSP-1375WC-NZ3X	5-MPSP-1375WC-NZ3X
2 Open Hole	Mandrel Reach Length: Indicates longest bore length that can be honed without extensions.					
	—		236,5 mm (9-5/16")	319,8 mm (12-19/32")	403,2 mm (15-7/8")	486,6 mm (19-5/32")
3 Blind Hole	—		261,9 mm (10-5/16")	345,2 mm (13-19/32")	428,6 mm (16-7/8")	512 mm (206-5/32")
4 Portahone Adapter Set	MPS-2230A	Input Yoke				
	MPS-2235A	Universal Cover (Not Shown) Order separately.				
5 Drive Extension	MPS-E2015	150 mm (5.9") supplied with 2 MPS-ER22 Disassembly Rings. Required for hookup to MPS drive motor.				
6 Drive Extension Assembly	DFA-NZ3X-1 (3)	914 mm (3 ft.) length				
	DFA-NZ3X-1 (6)	1829 mm (6 ft.) length				
	DFA-NZ3X-1 (9)	2743 mm (9 ft.) length				
	DFA-NZ3X-1 (12)	3657 mm (12 ft.) length				

* Longer than 5-Stone Length Mandrels are available on special request. Contact Customer Service.

NOTE: When ordering, specify for open or blind hole honing.

MPS Modular Tool System

I.D. Range:
37,6 mm – 44,45 mm
1.480"–1.750"



Open Hole: Order 1, 2, 4, 5, 6 For Complete MPS Honing Unit
Blind Hole: Order 1, 3, 4, 5, 6 For Complete MPS Honing Unit

1 Mandrel Number	Diameter Range		2-Stone	3-Stone	4-Stone	5-Stone*
	mm	in				
	37,6-41,3	1.480-1.625	2-MPSP-1500WD-NZ3X	3-MPSP-1500WD-NZ3X	4-MPSP-1500WD-NZ3X	5-MPSP-1500WD-NZ3X
	40,8-44,5	1.605-1.750	2-MPSP-1625WD-NZ3X	3-MPSP-1625WD-NZ3X	4-MPSP-1625WD-NZ3X	5-MPSP-1625WD-NZ3X
2 Open Hole	Mandrel Reach Length: Indicates longest bore length that can be honed without extensions.					
	—		236,5 mm (9-5/16")	319,8 mm (12-19/32")	403,2 mm (15-7/8")	486,6 mm (19-5/32")
3 Blind Hole	—		261,9 mm (10-5/16")	345,2 mm (13-19/32")	428,6 mm (16-7/8")	512 mm (206-5/32")
4 Portahone Adapter Set	MPS-2230A MPS-2235A	Input Yoke Universal Cover (Not Shown) Order separately.				
5 Drive Extensions	MPS-E2015	150 mm (5.9") supplied with 2 MPS-ER22 Disassembly Rings. Required for hookup to MPS drive motor.				
6 Drive Extensions Assembly	DFA-NZ3X-2 (3) DFA-NZ3X-2 (6) DFA-NZ3X-2 (9) DFA-NZ3X-2 (12)	914 mm (3 ft.) length 1829 mm (6 ft.) length 2743 mm (9 ft.) length 3657 mm (12 ft.) length				

* Longer than 5-Stone Length Mandrels are available on special request. Contact Customer Service.

NOTE: When ordering, specify for open or blind hole honing.

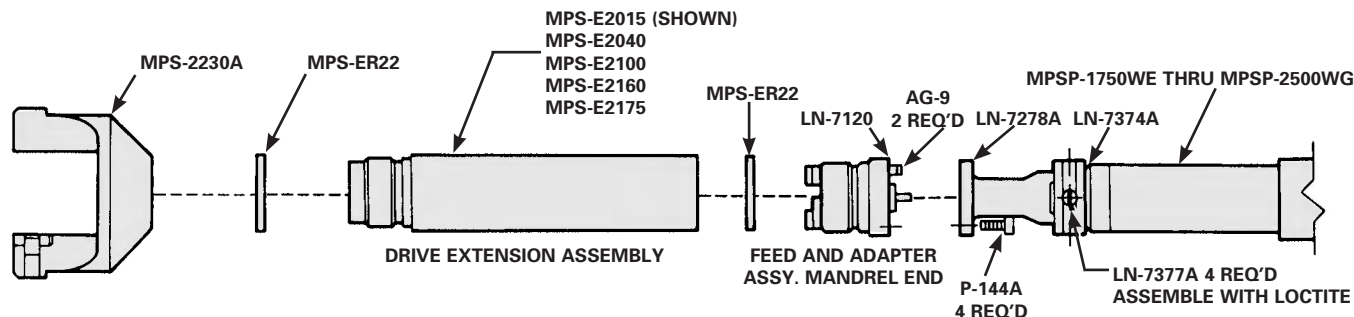
MPS Modular Tool System

MPS Portahones and Drive Extensions

Diameter Range:

43,94mm – 66,68mm

1.730" – 2.625"



Open Hole: Order 1, 2, 4, 5, 6 For Complete MPS Honing Unit

Blind Hole: Order 1, 3, 4, 5, 6 For Complete MPS Honing Unit

1 Mandrel Number	Diameter Range		2-Stone	3-Stone	4-Stone	5-Stone*
	mm	in				
	43,94-47,62	1.730-1.875	2-MPSP-1750WE	3-MPSP-1750WE	4-MPSP-1750WE	5-MPSP-1750WE
	47,12-50,80	1.855-2.000	2-MPSP-1875WE	3-MPSP-1875WE	4-MPSP-1875WE	5-MPSP-1875WE
	50,29-53,97	1.980-2.125	2-MPSP-2000WF	3-MPSP-2000WF	4-MPSP-2000WF	5-MPSP-2000WF
	53,47-57,15	2.105-2.250	2-MPSP-2125WF	3-MPSP-2125WF	4-MPSP-2125WF	5-MPSP-2125WF
	56,64-60,32	2.230-2.375	2-MPSP-2250WF	3-MPSP-2250WF	4-MPSP-2250WF	5-MPSP-2250WF
	59,82-63,50	2.355-2.500	2-MPSP-2375WG	3-MPSP-2375WG	4-MPSP-2375WG	5-MPSP-2375WG
	62,99-66,67	2.480-2.625	2-MPSP-2500WG	3-MPSP-2500WG	4-MPSP-2500WG	5-MPSP-2500WG
2 Open Hole	Mandrel Reach Length: Indicates longest bore length that can be honed without extensions.					
	—		236,5 mm (9-5/16")	319,8 mm (12-19/32")	403,2 mm (15-7/8")	486,6 mm (19-5/32")
3 Blind Hole			261,9 mm (10-5/16")	345,2 mm (13-19/32")	428,6 mm (16-7/8")	512 mm (20-5/32")
	—					
4 Portahone Adapter Set	MPS-2230A Input Yoke MPS-2235A Universal Cover (Not shown) Order separately.					
5 Drive Extensions	Supplied with 2 MPS-ER22 Disassembly Rings. Required for hookup to MPS drive motor. MPS-E2015 150 mm (5.9") MPS-E2040 399 mm (15.7") MPS-E2100 998 mm (39.3") MPS-E2160 1600 mm (63.0") MPS-E2175 1750 mm (68.9")					
6 Feed and Adapter Assembly (Mandrel End)	LN-7120 Note: Will also adapt to SNR & JNR Tooling					

*Longer than 5-Stone Length Mandrels are available on special request. Contact Customer Service.

MPS Modular Tool System

Repair Parts List for Portahones

[]-MPSP-1000VANZ3X thru []-MPSP-1375WCNZ3X

[]-MPSP-1000VANZ3X	[]J-MPSP-1	Replacement Wedge†
[]-MPSP-1062VANZ3X	[]J-MPSP-2	Replacement Wedge†
[]-MPSP-1125VBNZ3X	[]J-MPSP-3	Replacement Wedge†
[]-MPSP-1187VBNZ3X	[]J-MPSP-4	Replacement Wedge†
[]-MPSP-1250VBNZ3X	[]J-MPSP-4	Replacement Wedge†
[]-MPSP-1375WCNZ3X	[]J-MPSP-5	Replacement Wedge†
	DFA-NZ3X-FN1	Feed Nut
	PBR-65NZ3X	Thrust Bearing
	LN-7311	Feed Screw

†Note: Specify Blind or Open Hole.

These Portahones have precision fit wedges. It is recommended that the entire unit be returned to the factory for wedge replacement.

[] is the space left for the number of stones.

[]-MPSP-1500WDNZ3X thru []-MPSP-1625WDNZ3X

[]-MPSP-1500WDNZ3X	[]J-P28-MPSP	Replacement Wedge†
[]-MPSP-1625WDNZ3X	[]J-P28-MPSP	Replacement Wedge†
	DFA-NZ3X-FN2	Feed Nut
	PBR-66A	Thrust Bearing
	LN-7361	Feed Screw
	LN-7366	Wedge Block
	LN-7262A	Ring

†Note: Specify Blind or Open Hole.

These Portahones have precision fit wedges. It is recommended that the entire unit be returned to the factory for wedge replacement.

[] is the space left for the number of stones.

[]-MPSP-1750WE thru []-MPSP-2500WG

[]-MPSP-1750WE	[]J-P28-MPSP	Replacement Wedge*
[]-MPSP-1875WE	[]PH-P28-MPSP	Replacement Wedge*
[]-MPSP-2000WF	[]PH-P28-MPSP	Replacement Wedge*
[]-MPSP-2125WF	[]PH-P28-MPSP	Replacement Wedge*
[]-MPSP-2250WF	[]PH-P28-MPSP	Replacement Wedge*
[]-MPSP-2375WG	[]PH-P28-MPSP	Replacement Wedge*
[]-MPSP-2500WG	[]PH-P28-MPSP	Replacement Wedge*
	LN-7358	Feed Nut
	PBR-66A	Thrust Bearing
	LN-7357	Feed Nut End
	LN-7361	Feed Screw
	LN-7366	Wedge Block
	LN-7278A	Fork
	LN-7374	Ring
	LN-7377	Screws (4 Required)

*For blind hole application, change "P28" to "R28."

[] is the space left for the number of stones.

Repair Parts List for Obsolete Style Portahones

[G]-MPSP-1000VA thru [G]-MPSP-1375WC

[G]-MPSP-1000VA	[]J-MPSP-1	Replacement Wedge†
[G]-MPSP-1062VA	[]J-MPSP-2	Replacement Wedge†
[G]-MPSP-1125VB	[]J-MPSP-3	Replacement Wedge†
[G]-MPSP-1187VB	[]J-MPSP-4	Replacement Wedge†
[G]-MPSP-1250WB	[]J-MPSP-4	Replacement Wedge†
[G]-MPSP-1375WC	[]J-MPSP-5	Replacement Wedge†
	LN-7308	Feed Nut
	PBR-65A	Thrust Bearing
	LN-7307	Feed Nut End
	LN-7311	Feed Screw

†Note: Specify Blind or Open Hole.

These Portahones have precision fit wedges. It is recommended that the entire unit be returned to the factory for wedge replacement.

[] is the space left for the number of stones.

[G]-MPSP-1500WD thru [G]-MPSP-1625WD

[G]-MPSP-1500WD	[]J-P28-MPSP	Replacement Wedge†
[G]-MPSP-1625WD	[]J-P28-MPSP	Replacement Wedge†
	LN-7358	Feed Nut
	PBR-66A	Thrust Bearing
	LN-7357	Feed Nut End
	LN-7361	Feed Screw
	LN-7366	Wedge Block
	LN-7277A	U-Joint Fork
	LN-7262A	Ring
	LN-7279A	Screws

†Note: Specify Blind or Open Hole.

These Portahones have precision fit wedges. It is recommended that the entire unit be returned to the factory for wedge replacement.

[] is the space left for the number of stones.

[G]-MPSP-1750WE thru [H]-MPSP-2500WG

[G]-MPSP-1750WE	[]J-P28-MPSP	Replacement Wedge*
[H]-MPSP-1875WE	[]PH-P28-MPSP	Replacement Wedge*
[H]-MPSP-2000WF	[]PH-P28-MPSP	Replacement Wedge*
[H]-MPSP-2125WF	[]PH-P28-MPSP	Replacement Wedge*
[H]-MPSP-2250WF	[]PH-P28-MPSP	Replacement Wedge*
[H]-MPSP-2375WG	[]PH-P28-MPSP	Replacement Wedge*
[H]-MPSP-2500WG	[]PH-P28-MPSP	Replacement Wedge*
	LN-7358	Feed Nut
	PBR-66A	Thrust Bearing
	LN-7357	Feed Nut End
	LN-7361	Feed Screw
	LN-7366	Wedge Block
	LN-7278A	Fork
	LN-7374	Ring
	LN-7377	Screws (4 Required)

*For blind hole application, change "P28" to "R28."

[] is the space left for the number of stones.

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MB, & LB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MPS & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

GH Tooling

HONING UNIT
SELECTION GUIDE

For information about GH Honing Tools (for use with Sunnen HT Series, STH and SV Honing Machines), call **1-800-325-3670** and ask for the **GH Tooling and Abrasive Selection Guide, X-GH-2900**.

As well as the Basic Selection Guide, included is:

- Adapter Shank
- Drive and Adjusting Head Adapters
- Driveshaft Shank End
- Driveshaft
- Driveshaft Socket End
- Hone Head Driveshaft
- Flange Type Tool
- Slotted Type Tool
- Stoneholders
- Abrasives

PEDESTAL MACHINES
(ML, EC, MBB, & LBB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MPS & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING



Custom Tooling

MMT Tools

Multi-stone mandrels provide superior speed and accuracy on applications using a variety of high-production machines, including the Sunnen ML, EC, and KGM Series machines plus other major brands. These mandrels are for bore diameters ranging from 3,8 to 31,7 mm (.150 in. to 1.250 in.). For sizes above 31,7 mm (1.250 in.) consult your Sunnen Field Engineer.

Using multi-stone mandrels can also save you money ... per-part honing costs can be reduced by 30 percent in some applications versus conventional honing tools.

- Available with high-quality metal-bonded CBN or diamond precision graded superabrasive stones.
- Can be used with either water or oil-based coolants depending on application.
- Manufactured from high-strength steel to ensure long life.
- Precision machined, ensuring proper fit of superabrasive stones and generating bore geometry to meet your close-tolerance demands.
- Faster honing cycle times and improved stone life.
- Superabrasive stones can be specified for optimization on any application.
- Superior bore geometry out of the box - no need for (truing) the stones.
- Superior performance in distorted parts from heat-treat operations.
- Available quick-change design minimizes tool changeover time (for Sunnen machines only).



PH Tools

Ideal for diesel cylinder liners, automotive and light truck engine block cylinder bores, small engine cylinder bores, aircraft cylinder bores, gears, pump bodies and liners, hydraulic cylinders and other mid- to high-production applications of bore diameters ranging from 3.00 in. (76,2 mm) to 7.5 in. (190,5 mm).

Key Features

- Integral air gage available for in-process measurement for optimum control of the bore diameter
- Uses superabrasives, conventional abrasives or plateau honing tools
- Can be customized for any application — can use various abrasive dimensions to meet the diameter and bore length requirements of specific applications
- Engineered with high-quality steel for extended operating life
- Ideal for blind bore applications
- Match ground internal components for the ultimate in precision operation
- Designed for fast changeover and ease of installation
- For optimum roundness and straightness, tool can hold up to 12 stones
- End cap designed to guide the tool into the bore to prevent tool damage
- Can be used with Sunnen SV-500, SV-310, SV-3/4 and CK-21 honing systems
- Can be adapted to use on many honing machines manufactured by others



HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MBB, & LBB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MPS & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

Abrasives

For Sunnen Machines and Others

HONING UNIT
SELECTION GUIDE

PEDESTAL MACHINES
(ML, EC, MBB, & LBB)

PLATED TOOLING
(KGM & VSS MACHINES)

CYLINDER HONING
(SV-410 & SV-10 MACHINES)

PORTABLE, MPS & TUBE
HONE ABRASIVES

CUSTOM ABRASIVES
& TOOLING

Abrasives for Sunnen Machines

Sunnen Products Company is the world's foremost authority on honing and has incorporated more than 85 years of experience into research and development of honing abrasives. Sunnen honing abrasives increase performance, whether you use a Sunnen system or other honing equipment. Sunnen's superior line of honing abrasives can be tailored to be compatible with any finishing tools or finishing equipment. Sunnen technicians grade and qualify all honing stones,



before shipping them, to ensure that industries receive honing stones of the most enduring and exacting quality standard in precision honing performance.

Superabrasives for Sunnen Machines

Sunnen offers the widest range of superabrasive honing stones and diamond plated tools. They outperform ordinary abrasives and overcome the most difficult bore-sizing and finishing problems.

Sunnen offers two basic types of superabrasives:

- 1) Diamond—essential in the honing of glass, quartz, and the many varieties of tungsten carbide and ceramic material; cast iron
- 2) CBN (cubic boron nitride)—resists chemical attrition when honing steel. Essential in honing steel, hardened cast iron, inconel, stellite and titanium

Three types of superabrasive bonds are available: vitrified, metal, and resin. The many combinations of hardness and bond strength enable you to handle virtually any sizing or finishing application with extreme levels of precision and accuracy.

Increase the quality and consistency of your honing and bore-sizing operations.

GSA Non-Captive Abrasive (Genuine Sunnen Abrasives)

For many types of production honing machines...such as Nagel Barnes, Micromatic, Jones & Shipman, Gehring, Fuji, Kadia, Nissin, Engis, Accucut.

This line includes unmounted stick abrasives as well as mounted abrasives compatible with non-Sunnen equipment, in a broad range of grit sizes, abrasive types and dimensions.

The GSA line complements our already broad range of honing abrasives—from aluminum oxide and silicon carbide to diamond and CBN. Sunnen offers the industry's largest variety of bond types, grain sizes, and stone configurations. You get exactly what you need, when you need it.

Sunnen has dedicated a 7900 square-meter (85000 sq. ft.) facility to the development, manufacture and distribution of abrasives. The facility provides production economies and the highest level of quality in the industry.

With Sunnen GSA Non-Captive Abrasives, your honing operation can achieve greater levels of precision...quality and consistency.

For more information on how Sunnen GSA Non-Captive Abrasives can help solve your bore-sizing operations, call your Sunnen sales and application engineer.



External Honers and Accessories

O.D. Range:
3 mm – 115 mm
.120"–4.500"

Honing Tools for Finishing External Diameters

For low production — tool room — salvage — maintenance.

- Recommended for almost any material, including hardened steel, carbide, ceramic and glass.
- Removes "cloverleaf" centerless grind pattern and chatter marks.
- Corrects waviness and "rainbow" warpage, barrel, taper, and out-of-round.
- Many times faster and cleaner than lapping.

Adapter Chucks

Fit Sunnen Honing Machine spindles. Hold work being rotated for external honing operations.



MB-748

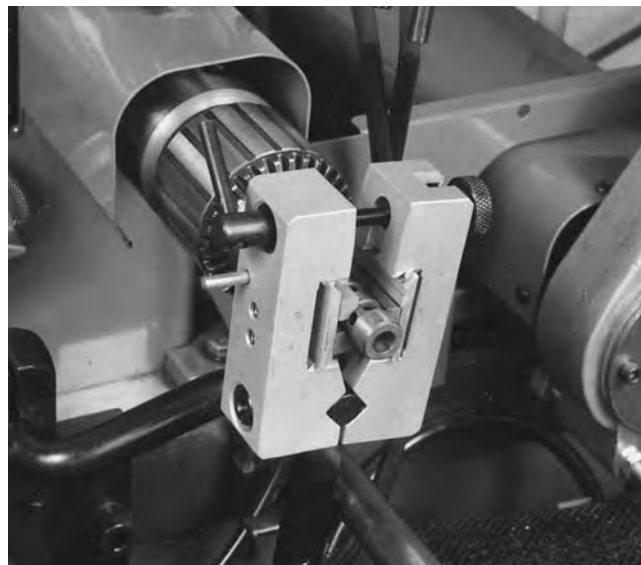


MB-750

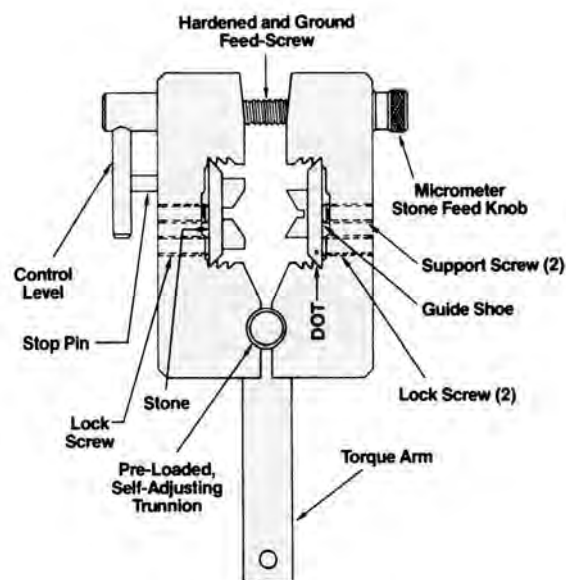


MB-770

Part Number	Diameter Range	
	mm	in
MB-748	0 - 10	0 - 3/8
MB-750	5 - 19	3/16 - 3/4
MB-770	3 - 127	1/8 - 5



FB-E External Honer Body with MB-750 External Adapter Chuck in MBB-1660 Horizontal Honer.



Typical External Honer Body with stone & shoe inserted

ADAPTERS & OTHER
ABRASIVES & TOOLING

MACHINE
ACCESSORIES

GAGING

FILTERS

HONING FLUIDS
& COOLANTS

TECHNICAL DATA

External Honers and Accessories

Tooling Selection

O.D. Range:

3 mm – 115 mm

.120"–4.5"

For Sizing and Finishing

When surface finishing or precision sizing is the reason for using the external hone, use a single stone and guide shoe in the proper hone body.

When correction of bow or waviness is the reason for external honing, select tooling from table below.

Order 1-3 For Sizing and Finishing								
Diameter Range 3 mm - 115 mm .120" - 4.5"		1 Hone Body	2 Guide Shoes†	3 Honing Stone	Length of Stone or Guide Shoe			
mm	in		For All Metals	For use with Diamond or CBN/Borazon Stones only	See Stone Tables.	mm	inches	
3-6	.120-.240	FA-E	FA4-B*	FA4-BB*		13	1/2	
		Weight:	FFA4-B*	FFA4-BB*		25	1	
6-8	.240-.300	.2 kg (.5 lb)	FA8-B	FA8-BB		19	3/4	
8-10	.300-.400		FA10-B	FA10-BB		25	1	
10-15	.400-.580	FB-E Wt:	FB13-B	FB13-BB		25	1	
15-20	.580-.800	.9 kg (2 lbs)	FB19-B	FB19-BB		38	1-1/2	
20-28	.800-1.100	FC-E	FC26-B*	FC26-BB*		51	2	
		Wt: 2,5 kg (5.5 lbs)	FFC26-B*	FFC26-BB*		102	4	
28-38	1.100-1.500		FC36-B	FC36-BB		64	2-1/2	
38-51	1.500-2.000	FD-E	FD48-B	FD48-BB		76	3	
51-70	2.000-2.750	Wt: 4,7 kg (10.3 lbs)	FD64-B	FD64-BB		102	4	
70-115	2.750-4.500	FD-E-N88X Wt: 4,8 kg (10.5 lbs)	FD64-B	FD64-BB		102	4	

*When a choice of a stone and shoe length is available, use stone and guide shoe closest to length of part to be honed.

O.D. Range:

3 mm – 38 mm

.120"–1.5"

For Bow Removal and Alignment of Tandem Lands

For correction of bow or waviness, the stone and guide shoe length should be 1-1/2 times the length of the work, if possible.

Hone bodies, guide shoes, and honing stones are the same as above.

Order 1-4 For Bow Removal and Alignment of Tandem Lands									
Diameter Range 3 mm - 38 mm .120" - 1.5"		1 Hone Body	2 Multiple Holder (2 required)	3 Guide Shoes†	4 Honing Stone	Total Length			
mm	in			Max. Qty.	For use with all metals	For use with Diamond or CBN/Borazon Stones only	Max. Qty.	mm	in
3-6	.120-.240	FB-E	FB-FA	5	FA4-B**	FA4-BB**	5	64	2-1/2
				3	FFA4-B**	FFA4-BB**	3	76	3
6-8	.240-.300			4	FA8-B	FA8-BB	4	76	3
8-10	.300-.400	FC-E	FC-FB	3	FA10-B	FA10-BB	3	76	3
10-15	.400-.580			4	FB13-B	FB13-BB	4	102	4
15-20	.580-.800			3	FB19-B	FB19-BB	3	114	4-1/2
20-28	.800-1.100	FD-E	FD-FC	4	FC26-B**	FC26-BB**	4	203	8
				2	FFC26-B**	FFC26-BB**	2	203	8
28-38	1.100-1.500			3	FC36-B	FC36-BB	3	190	7-1/2

** Where a choice of stones and guide shoes can be used, the FFA4- and FFC26- are more economical.

† Note that when you use diamond stones to hone carbides, ceramics and glass, order guide shoe as listed for that application.

This guide shoe is twice as wide as the regular guide shoe, for greater stability when using narrow diamond stones.

External Honing Stones and Accessories

Abrasives Selection

External Honing Stones											
Diameter Range		Hone Body with Multiple Holders	Hone Body	Grit Size							
mm	in			150	220	280	320	400	500	600	
3-6	.120-.240	FB-E with FB-FA	FA-E	Aluminum Oxide (AA) - 2 per box							
				Single Length				FA4-AA75		FA4-AA93 FA4-AA95	
				Double Length				FFA4-AA73 ⁺		FFA4-AA93 ⁺ FFA4-AA95	
6-8	.240-.300						FA8-AA73 ⁺		FA8-AA95		
8-10	.300-.400						FA10-AA75		FA10-AA95		
10-15	.400-.580		FC-E with FC-FB	FB-E				FB13-AA73		FB13-AA93 FB13-AA95	
15-20	.580-.800						FB19-AA73 FB19-AA75		FB19-AA93 FB19-AA95		
20-28	.800-1.100	FD-E with FD-FC	FC-E	Single Length			FC26-AA73 FC26-AA75 ⁺		FC26-AA93 ⁺		
28-38	1.100-1.500			Double Length			FFC26-AA73 ⁺ FFC26-AA75 ⁺		FC26-AA95 ⁺		
								FC36-AA75		FC36-AA95 ⁺	
38-51	1.500-2.000	N/A	FD-E				FD48-AA73		FD48-AA93		
51-70	2.000-2.750										
70-115	2.750-4.500	N/A	FD-E N88X		FD64-AA45		FD64-AA73 ⁺ FD64-AA75 ⁺		FD64-AA93 ⁺ FD64-AA95 ⁺		

3-6	.120-.240	FB-E with FB-FA	FA-E	Silicon Carbide (JJ/CC) - 2 per box								
				Single Length								
				Double Length							FA8-JJ95 ⁺ FA8-CC05 ⁺	
6-8	.240-.300							FA8-JJ95 ⁺	FA8-CC05 ⁺			
8-10	.300-.400							FA10-JJ95 ⁺	FA10-CC05 ⁺			
10-15	.400-.580	FC-E with FC-FB	FB-E			FB13-JJ63		FB13-JJ95 ⁺	FB13-CC05 ⁺			
15-20	.580-.800							FB19-JJ95 ⁺	FB19-CC05 ⁺			
20-28	.800-1.100	FD-E with FD-FC	FC-E	Single Length				FC26-JJ93 ⁺	FC26-CC05 ⁺			
28-38	1.100-1.500			Double Length					FFC26-CC05 ⁺			
									FC36-JJ93 ⁺	FC36-CC05 ⁺		
38-51	1.500-2.000	N/A	FD-E					FD48-JJ93 ⁺	FD48-CC05 ⁺			
51-70	2.000-2.750							FD64-JJ93 ⁺	FD64-CC05 ⁺			
70-115	2.750-4.500	N/A	FD-E N88X									

Note: If double length stone is used (FFA4- or FFC26-), you must use guide shoes with identical prefix.
Example: Use FFA4-AA73 stone with FFA4-B shoe.

⁺ Special Order - Contact Customer Service

External Honers and Accessories

Abrasives Selection

Superabrasive Diamond and CBN

Superabrasive Diamond and CBN stones are available for honing hardened steels, carbide, ceramic, and glass.

Diameter Range		Vitrified Bond Diamond Stones		
mm	in	220	400	600
3-6	.120-.240			
3-6	.120-.240			
6-8	.240-.300			
8-10	.300-.400		FA10-DV87 ⁺	FA10-DV07
10-15	.400-.580	FB13-DV57 ⁺		FB13-DV07
15-20	.580-.800			FB19-DV07
20-28	.800-1.000	FC26-DV57 ⁺		FC26-DV07 ⁺
20-28	.800-1.000			
28-38	1.100-1.500			FC36-DV07
38-51	1.500-2.000	FD48-DV57 ⁺	FD48-DV87 ⁺	FD48-DV07 ⁺
51-115	2.000-4.500	FD64-DV57 ⁺		FD64-DV07

⁺ Special Order - Contact Customer Service

In some cases, stones other than the RECOMMENDED STONES may hone faster or last longer. For long or repetitive production runs, it may be economical to choose a stone slightly harder or softer, coarser or finer. As a general rule, hard materials require soft stones; soft materials require hard stones; rough holes require hard stones.

* 1st choice

** 2nd choice.
Use if AA73
does not cut.

* 1st choice

** 2nd choice.
Use if AA95
does not cut.

Superabrasive Selection Chart

		Grit Size				
		100	150	220	400	600 1200
H---S	H---S	CBN Metal Bond				
			NM55 ⁺ NM57 ⁺	NM85 ⁺	NM05 ⁺	NM005 ⁺
H---S	H---S	Diamond Metal Bond				
		DM45 ⁺	DM55 ⁺	DM85	DM05 ⁺ DM07 ⁺	DM005 ⁺ DM007 ⁺
H---S	H---S	CBN/Borazon Resin Bond				
			NR53 ⁺	NR83 ⁺		
H---S	H---S	Diamond Resin Bond				
						DR007 ⁺

NOTE: Usually the softest grade of stone is most effective.

Recommended Stones

Material	Stone to Use	Approximate Ra Surface Finish	
		µm	µin
Fast removal: deburred, bored, ground, reamed holes			
Aluminum	AA73	0,68	27
Brass, Soft	AA73	0,68	27
Bronze	AA75	0,68	27
Carbide	DV57	0,50	20
Cast Iron	AA75	0,50	20
Ceramic	DV57	1,00	40
Glass	DV87	1,75	70
Steel, Soft	AA75	0,63	25
Steel, Hardened*	AA73	0,45	18
Steel, Hardened**	NR53†	0,75	30
Fine finishing: previously honed holes			
Aluminum	AA95	0,30	12
Brass, Soft	AA95	0,30	12
Bronze	AA95	0,30	12
Carbide	DV07	0,08	3
Cast Iron	AA95	0,13	5
Ceramic	DV07	0,38	15
Glass	DV07	0,38	15
Steel, Soft	AA95	0,05	2
Steel, Hardened*	AA95	0,03	1
Steel, Hardened**	NR83†	0,18	7

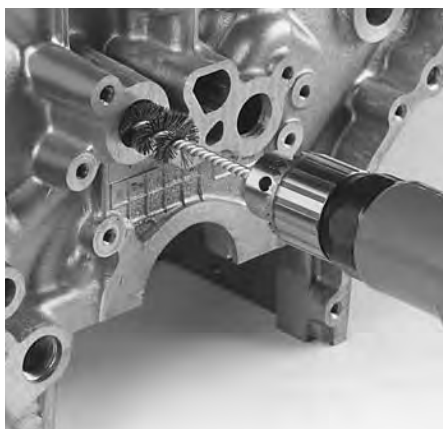
† Available on special order

NOTE: Some recommended stones are special orders. Please contact Sunnen for availability.

"Micro" Deburring Brushes

Workpiece Minimum Inside Diameter		Part Number	Deburring Brush					
			A Brush Diameter		B Brush Length		C Overall Length	
mm	inches		mm	in	mm	in	mm	in
.762	.030	DB-032	.813	.032	12.7	.50	101.6	4.0
1.143	.045	DB-047	1.194	.047	12.7	.50	101.6	4.0
1.575	.062	DB-064	1.626	.064	19.05	.75	101.6	4.0
1.981	.078	DB-080	2.032	.080	19.05	.75	101.6	4.0
2.388	.094	DB-096	2.438	.096	19.05	.75	101.6	4.0
2.769	.109	DB-111	2.819	.111	25.4	1.0	101.6	4.0
3.175	.125	DB-128	3.251	.128	25.4	1.0	101.6	4.0
4.013	.158	DB-159	4.039	.159	25.4	1.0	127.0	5.0
4.750	.187	DB-191	4.851	.191	25.4	1.0	127.0	5.0
5.537	.218	DB-222	5.639	.222	25.4	1.0	127.0	5.0
6.350	.250	DB-255	6.477	.255	50.8	2.0	127.0	5.0
7.137	.281	DB-288	7.315	.288	50.8	2.0	127.0	5.0
7.925	.312	DB-321	8.153	.321	50.8	2.0	127.0	5.0
8.712	.343	DB-355	9.017	.355	50.8	2.0	127.0	5.0
9.525	.375	DB-389	9.881	.389	50.8	2.0	127.0	5.0
10.31	.406	DB-422	10.72	.422	50.8	2.0	127.0	5.0
11.10	.437	DB-455	11.56	.455	50.8	2.0	127.0	5.0
11.91	.469	DB-489	12.42	.489	50.8	2.0	127.0	5.0
9.5	.375	DB-500	12.7	.500	50.8	2.0	127.0	5.0
11.1	.437	DB-563	14.3	.563	50.8	2.0	127.0	5.0
12.7	.500	DB-625	15.9	.625	50.8	2.0	127.0	5.0
13.4	.531	DB-688	17.5	.688	63.5	2.5	139.7	5.5
14.7	.578	DB-750	19.1	.750	63.5	2.5	139.7	5.5
15.5	.609	DB-813	20.6	.813	63.5	2.5	139.7	5.5
15.9	.625	DB-875	22.2	.875	63.5	2.5	139.7	5.5
16.3	.641	DB-938	23.8	.938	63.5	2.5	139.7	5.5
16.7	.656	DB-1000	25.4	1.000	63.5	2.5	139.7	5.5
18.3	.719	DB-1125	28.6	1.125	101.6	4.0	254.0	10.0
20.2	.797	DB-1250	31.8	1.250	101.6	4.0	254.0	10.0
22.2	.875	DB-1375	34.9	1.375	101.6	4.0	254.0	10.0
23.8	.938	DB-1500	38.1	1.500	101.6	4.0	254.0	10.0
24.6	.969	DB-1625	41.3	1.625	101.6	4.0	254.0	10.0
26.6	1.047	DB-1750	44.5	1.750	101.6	4.0	254.0	10.0
28.6	1.125	DB-1875	47.6	1.875	101.6	4.0	254.0	10.0
29.4	1.156	DB-2000	50.8	2.000	101.6	4.0	254.0	10.0
32.9	1.297	DB-2250	57.2	2.250	101.6	4.0	254.0	10.0
36.9	1.453	DB-2500	63.5	2.500	101.6	4.0	254.0	10.0
40.9	1.609	DB-2750	69.9	2.750	101.6	4.0	254.0	10.0

NOTE: For additional sizes larger than 63,5mm (2.5") refer to PHT brushes on page 5.16.



Selection

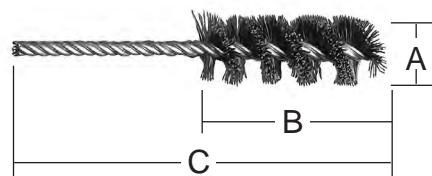
The proper brush diameter to use for a given part size depends on the purpose of the deburring operation. For general surface conditioning and edge breaking choose a brush with large interference to promote cutting on the sides of the bristles. For an application such as thread deburring, choose a brush with a small amount of interference in the part in order to cut mostly on the bristle tips. Refer to the chart at left for the proper application.

An inexpensive alternative for micro deburring of threads and bore interruptions.

Sunnen's "DB" Series Deburring Brushes can quickly debur bores from .762 to 63,5 millimeters (.030" to 2.5").

Micro deburring offers many unique advantages in machine shops, manufacturing plants, and automotive engine rebuilding shops.

- Gentle wiping action of bristles produces a slight edge radius across bore interruptions.
- Flexible, nylon bonded, silicon carbide abrasive is effective on most materials.
- Lighter cutting action of brush reduces surface stress on workpieces.
- Mounts in a hand drill or automatic machines.



Notes

ADAPTERS & OTHER ABRASIVES & TOOLING	
MACHINE ACCESSORIES	
GAGING	
FILTERS	
HONING FLUIDS & COOLANTS	
TECHNICAL DATA	

MBB/MBC/EC/ML Series

Accessories and Supplies

EC-6550A Runout Indicator For EC, ML, KGM Machines



MBC-400A Runout Indicator For MBB/MBC Machines



KKN-100 Honing Fixture

A precision fixture for use when honing very short holes - where diameter of bore is more than three times the length, and the part has a flat face. Permits honing parts that otherwise are too short to be stabilized on the honing tool. Order face plates separately. Recommendation of Sunnen Field Engineer is suggested. Fits MBB-1650 and later models. *Shipping Weight: 35,7 kg (78.5 lbs.)*



Accessories for Square Honing on Power-Stroke Machine

KKN-615A Flex Pad can be used to hold part tight against faceplate.

KKN-265A Lineup Faceplate may be ordered for use as a fixture component.

EC-7100 Square Honing Fixture

This fixture is similar to the universal honing fixture which is supplied with the EC and ML Machines. The fingers move in the same scissors type motion as on the universal fixture. Also, the fingers automatically hold the workpiece against the faceplate with the start of the honing cycle and release at the end.

Accessories for Square Honing on ML Machine

EC-7150 Square Honing Conversion Kit:

This fixture kit will convert the standard universal fixture to the EC-7100 Square Honing Fixture.

EC-7080 Faceplate Mounting Kit:

The Mounting Kit consists of the parts required to fasten and adjust the faceplates on the stoker carriage. This new finger knob design allows for faster and easier adjustments of the faceplates. A mounting kit may be purchased for each faceplate to make changing setups faster.

EC-7000 Series Faceplates:

The EC-7000 Series Faceplates are a set of thirteen faceplates covering the same range as the KKN Faceplates. The faceplate numbers are as follows:

EC Series Faceplates for EC-ML Honing Machines				
Faceplate O.D.		Faceplate I.D.		Faceplate Number
mm	in.	mm	in.	
9,2	.362	5,5	.216	EC-7001\$
10,0	.398	6,3	.248	EC-7002\$
12,0	.472	7,8	.307	EC-7003\$
15,0	.590	10,0	.394	EC-7004\$
19,0	.750	13,4	.528	EC-7005\$
24,0	.945	17,0	.670	EC-7006\$
29,5	1.160	21,4	.843	EC-7007\$
37,0	1.457	26,9	1.060	EC-7008\$
44,2	1.740	33,0	1.300	EC-7009\$
53,0	2.087	39,9	1.570	EC-7010\$
63,0	2.480	44,7	1.880	EC-7011\$
71,6	2.820	56,3	2.220	EC-7012\$
81,0	3.190	65,7	2.590	EC-7013\$

NOTE: Request Product Bulletin #P-1153I on how to modify an EC Style Faceplate to fit the MBB & MBC Honing Machines.

\$NOTE: When ordering Faceplates for use on Precision Honing Machines, order one EC-7080 Square Honing Faceplate Mounting Kit and one KKN-260A Indicator Support Bar. (Only one Kit and Indicator Support Bar is required for all EC-7000 series faceplates. An EC-7080 Kit may be ordered for each faceplate, to make changing setup of faceplates on stoker carriage quicker).

EC-4500 Optional Automatic Size Control Unit

For EC & ML Power-Stroke Honing Machines

The EC-4500 automatic size control unit attaches quickly and easily to ML honing machines. Features automatic positioning which moves the probe into position at the beginning of the honing cycle and retracted at the end of the cycle so that a new workpiece can be installed. Uses standard A.S.C. probes. (See page 8.4)

Shipping Weight: 52 kg (11 lbs.)

MB-2333A Extra-Long Offset Torque Bar

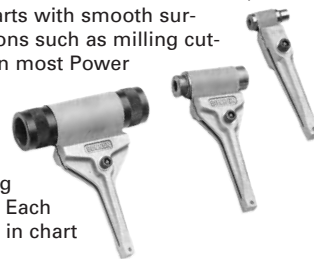
584 mm (23") Long

Useful for absorbing torque on workpieces which are too long for the standard 330 mm (13") torque bar. Easy to install in seconds.

Shipping Weight: 2,04 kg (4.5 lbs.)

Loop-Grip Holding Fixtures

Especially useful for hard-to-hold parts such as thinwall tubes, glass barrels, valve spools, small parts with smooth surfaces, and parts with sharp projections such as milling cutters. A must for absorbing torque on most Power Stroker jobs. Uses emery cloth to grip the part securely without distortion. Parts can be inserted and removed easily. Fixture handle rests on torque bar to absorb honing torque and reduce operator fatigue. Each fixture handles diameters as shown in chart (let out loop as needed).



Fixture Part Number Includes .9 m (3 ft.) of emery cloth	For Emery Cloth		Minimum Dimensions of Parts to be Honed				Replacement Emery Cloth
	Width		Length		Outside Diameters		7,6 m (25 ft. Length)
	mm	in.	mm	in.	mm	in.	
HF-75	19,0	3/4	12,7	1/2	3,1	1/8	HF-110
HF-200	50,0	2	50,0	2	9,5	3/8	HF-210
HF-300	76,2	3	76,2	3	19,0	3/4	HF-310*
HF-355	Set of all three fixtures above.						

All others 240 Grit.

*NOTE: HF-320 Heavy Duty Abrasive Cloth 7,6 m (25 ft. length) is available for use in the HF-300 Holding Fixture and must be ordered separately. 120 Grit is more tear resistant and is suggested for those applications which use higher pressure control settings on the honing machine or where the rough hole in the workpiece makes the heavy duty cloth more desirable.

KKN-980 and KKN-990 Gimbal Fixtures

The Sunnen KKN-980 and KKN-990 Gimbal Fixtures attach to the Power Stroking Arm of any Sunnen Power Stroked Honing Machine. Used with a customer manufactured workholding fixture. Allows the workpiece to float freely on the mandrel, absorb torque, and provides ease in loading and unloading fixture design.



Model	Maximum Workpiece O.D.		Ring I.D.		Maximum Workholder O.D.		Maximum Pivot Pin Length		Pivot Pin O.D.	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
KKN-980	36,5	1 7/16	49	1 15/16	46	1 13/16	6,5	1/4	5	3/16
KKN-990	57,2	2 1/4	70	2 3/4	66	2 5/8	6,5	1/4	5	3/16

MBB/MBC/EC/ML

Accessories and Supplies

ADAPTERS & OTHER
ABRASIVES & TOOLING



MAN-700 Diamond Dresser

Essential to keep honing stones sharp and free cutting - saves time and labor costs. When cutting action of stone slows down, a light stroke with the Diamond Dresser breaks the glaze on the stone and restores honing efficiency. Especially recommended when honing hard alloy steels. (Not for use with CBN/Borazon or diamond honing stones.)
Shipping Weight: ,1 kg (.25 lb.)

MACHINE
ACCESSORIES



LBN-700 Abrasive Stick

(Silicon Carbide, 220 Grit)
For dressing CBN/Borazon and diamond honing stones only; for cleaning stones loaded with brass, bronze, or aluminum; for shaping a keyway stone; and for shortening a stone for blind hole work or to eliminate bellmouth. *Shipping Weight: ,1 kg (.25 lb.)*

GAGING



MBB/MBC Spindle Sleeves

Concentric
LN-570A Spindle Sleeve. Required for assembled P20 and smaller P28 type mandrels into spindle nose of MBB/MBC machine.
Shipping Weight: ,2 kg (.50 lb.)



Eccentric
LN-0116A Spindle Sleeve. Similar in purpose to concentric sleeve above. Can be indexed to reduce mandrel runout in older machines equipped with non-adjustable spindle nose.
Shipping Weight: ,2 kg (.50 lb.)

FILTERS



Work Lights

Provide excellent glareless illumination. Completely adjustable. Mounts on Honing Machine. Supplied as shown with extension cord, on-off switch.

HS-15 For ML-/EC Honing Machines
MBC-200 For MBB Honing Machines

HONING FLUIDS
& COOLANTS



MB-2410 Work Tray

For MBB-1660. Package of 2. Attaches to left and right side of machine work tray. Keeps work area of machine free of parts while honing.
Shipping Weight: 6,1 kg (13.5 lbs.)

MB-2418A Replacement Pad for MB-2410 Tray. Package of one.
Shipping Weight: ,45 kg (1 lb.)

TECHNICAL DATA

Side Tray-EC/ML Machines

EC-6515A Side Tray
EC-6519A Replacement Mat for EC-6515A Side Tray EC/ML Machines

GH-80049 Truing Grit

Aids in truing in metal bond superabrasives. 70 grit (1pt.)

Replacement Belts for ML/EC

PDB-320A Stroker Belt All EC & ML Machines
PDB-206A Timing Belt All EC & ML Machines
PDB-326A Spindle Belt EC-3500 & ML-3500 Only
PDB-340 Spindle Belt for ML-2000, 4000 & 5000



For All MBC and MBB-1800 Power-Stroke Machines

MBB-1830A	Drive Motor Belt for 60 Hz machines	MBB-1840A	Spindle Drive Belt
MBB-1833A	Drive Motor Belt for 50 Hz machines	MBB-1823A	Brake Strap
		KKN-444A	Stroker Belt

For MBB-1690 Power-Stroke Machines

MBB-2620A	Drive Pulley V-Belt for Serial No. 82550 & Greater	MB-2292	Oil Pump Belt
MBB-2720A	Drive Pulley V-Belt for Serial Nos. prior to 82550	MBB-969A	Brake Strap Set
		KKN-444A	Gear Box Pulley Belt

For MBB-1660 Manual Honing Machines

MBB-2620A	Drive Motor Belt	MBB-969A	Brake Strap
MBB-910	Spindle Drive Belt	MB-2292	Pump Belt

Touch Up Paint

MBB-90437A Vista Green
MBC-90411A Pearl Grey
MBC-90412A Pewter Grey
Machine tool lacquer in 1 pint aerosol spray can.
Shipping Weight: ,45 kg (1 lb.)



NOTE: No longer available for export due to shipping restrictions for aerosol cans.

MB-2328C Replacement Anti-Splash Pads

MBB Honing Machines.
Package of 2 (upper and lower). *Shipping Weight: ,9 kg (2 lbs.)*

2.5X Magnifying Glass

Ground optical glass. Ideal for identifying numbers on small stones, for close examination of fine details, and for increased reading accuracy of Sunnen Precision Bore Gages, etc. Available in convenient leather case, or with spring clip for mounting on gage.

LN-150 Magnifying glass in leather case
Shipping Weight: ,1 kg (.25 lb.)

PG-25 Magnifying glass with spring clip
Shipping Weight: ,1 kg (.25 lb.)



LBN 462A Mandrel Wrench

For MBB/LBB/SV-10/SV-310
1/4" Hex Key and Wedge removal tool.



Hex Key Wrench Kits with Vinyl Pouch

PHS-50A 3/32, 3/16, 1/8, 5/32, 5/16, 5/64, 7/32, 1/4, 3/8, 7/64.
For MBB/LBB/SV-10 Machines.

PHS-50M 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10 mm.
For SV-1000/SV-310.

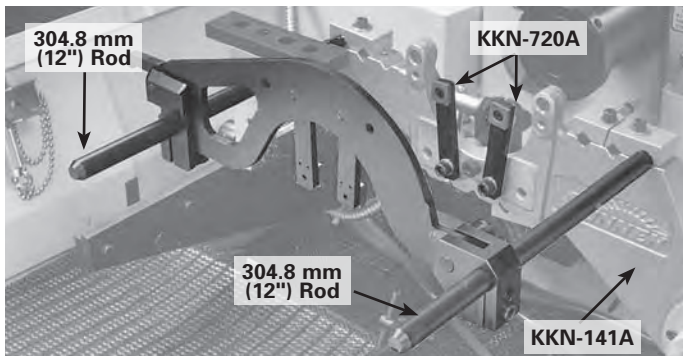
MBB/MBC/EC/ML

Accessories and Supplies

KKN-750 Universal Honing Fixture

For MBB/MBC

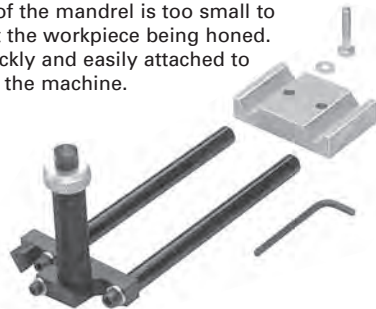
Accommodates almost any workpiece or fixture. Easily and quickly installed or removed. Takes the thrust on forward and back strokes. Includes two pairs of fingers with long-wearing, adjustable carbide pads (including pair of KKN-720A Fingers at rear), two pairs of driving fingers for use with external hones, and 305 mm (12") long rods. (For longer workpieces, 457 mm (18") long KKN-778A Rods can be ordered separately.)



KKN-800 Part Support

Makes it easy to hone heavy workpieces on the MBB The KKN-800 supports workpieces weighing up to 7 kg (15 lbs.), and is recommended whenever the size of the mandrel is too small to adequately support the workpiece being honed. The KKN-800 is quickly and easily attached to the stroking arm of the machine.

Shipping Weight:
7 kg (15 lbs.)



KKN-631A Part Support

Clamp Block with Four Screws and Washers

MMT/KRO Adapters for EC/ML

ML7210 Adapter Kit Consisting of Adapter/Alignment Bar, Collet Nut, Spanner Wrench and Extraction Tool.

NOTE: Either MMTSC1 or MMTSC2 Collet required for use of alignment bar.

NOTE: Must order tool collet separately -
MMTSC1 for 17mm shank tool,
MMTSC2 for 23mm shank tool,
MMTSC3 for 25mm shank tool,
MMTSC4 for 16mm shank tool,

EC-ND5X Part Support

For EC/ML Honing Machines

Similar to the KKN-800 Part Support. Allow 4 weeks for del.

Shipping Weight: 1 kg (2.2 lbs.)

EC-6031A Manual Torque Arm Kit-EC/ML

ML-6190

Standard Torque Arm

EC-7190 Long Fixture Support Bars

For EC/ML Machines

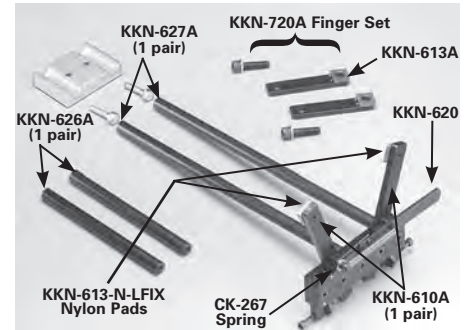
Attaches to the ML-6100 Stroking Arm of the EC/ML Machines and allows the honing of parts up to 357 mm (14") in length.

Shipping Weight: 1,5 kg (3.3 lbs.)

KKN-600 Honing Fixture for Small Parts

Accommodates most parts. Especially useful for small pieces. Easily and quickly installed or removed. Includes long-wearing, adjustable carbide pads on fingers, two pairs of support rods, and clamp. See photo to identify replacement parts.

Shipping Weight:
1,8 kg (4 lbs.)



MBC-365 Fully Adjustable Spindle Nose Kit

For MBB-1660 Manual Honing Machines

Kit Includes:

Adjustable Spindle Nose, Spindle Nose Cover, Indicator and Mounting Hardware.

ADAPTERS & OTHER
ABRASIVES & TOOLING

MACHINE
ACCESSORIES

GAGING

FILTERS

HONING FLUIDS
& COOLANTS

TECHNICAL DATA

ASC

Sensing Units and Setting Fixture

For Use with EC-4500 Automatic Size Control Unit on EC/ML Machines

Automatic Size Control Sensing Tips 3,18 mm - 25,8 mm (1/8" - 1-1/64")

Diameter Sensing Tips

Sensing Tips consist of a split plug with central adjusting screw. Adjustment compensates for wear—extends the life of the sensing tip. You can also use the same sensing tip for rough and finish honing. Useful diameter range is approximately .38 mm (.015"). Special probes are available for high production applications. Contact Sunnen Customer Service.



ASC-0500
Sensing Tip

Sensing Units and Setting Fixture

26 mm - 51 mm (1" - 2") Diameter

The ASC-50 Micrometer-Type Setting Fixture is used to set the four radial adjusting screws centrally and to rough size. Final setting is accomplished by adjusting center screw in the split plug body.

Sensing Unit Part Number	Diameter Range	
	mm	in
ASC-51	26 - 32	1 - 1 1/4
ASC-52	32 - 38	1 1/4 - 1 1/2
ASC-53	38 - 45	1 1/2 - 1 3/4
ASC-54	45 - 51	1 3/4 - 2



ASC-51
Sensing Unit



ASC-50
Setting Fixture

Sensing Tip Part No.	Nominal Diameter		Diameter Range				Sensing Tip Part No.	Nominal Diameter		Diameter Range			
	mm	in	Low mm	Low in	High mm	High in		mm	in	Low mm	Low in	High mm	High in
ASC-0125	3,18	1/8	3,05	.120	3,53	.139	ASC-0594	15	19/32	14,81	.583	15,29	.602
ASC-0141	3,57	9/64	3,42	.135	3,91	.154	ASC-0609	15,48	39/64	15,22	.599	15,70	.618
ASC-0156	4	5/32	3,81	.150	4,29	.169	ASC-0625	15,88	5/8	15,62	.615	16,10	.634
ASC-0172	4,36	11/64	4,22	.166	4,70	.185	ASC-0630	16		15,75	.620	16,23	.639
ASC-0188	4,76	3/16	4,57	.180	5,05	.199	ASC-0641	16,27	41/64	16,03	.631	16,51	.650
ASC-0203	5	13/64	4,85	.191	5,33	.213	ASC-0656	16,67	21/32	16,41	.646	16,89	.665
ASC-0219	5,56	7/32	5,36	.211	5,84	.230	ASC-0672	17	43/64	16,79	.661	17,27	.680
ASC-0234	6	15/64	5,74	.226	6,22	.245	ASC-0688	17,46	11/16	17,22	.678	17,70	.697
ASC-0250	6,35	1/4	6,10	.240	6,58	.259	ASC-0703	18	45/64	17,70	.697	18,19	.716
ASC-0266	6,75	17/64	6,50	.256	6,99	.275	ASC-0719	18,26	23/32	18,01	.709	18,49	.728
ASC-0281	7	9/32	6,83	.269	7,32	.288	ASC-0734	18,65	47/64	18,39	.724	18,87	.743
ASC-0297	7,54	19/64	7,29	.287	7,77	.306	ASC-0750	19	3/4	18,80	.740	19,28	.759
ASC-0312	8	5/16	7,72	.304	8,20	.323	ASC-0766	19,45	49/64	19,20	.756	19,69	.775
ASC-0328	8,33	21/64	8,08	.318	8,56	.337	ASC-0781	20	25/32	19,69	.775	20,17	.794
ASC-0344	8,73	11/32	8,48	.334	8,97	.353	ASC-0797	20,24	51/64	19,99	.787	20,47	.806
ASC-0359	9	23/64	8,81	.347	9,30	.366	ASC-0812	20,64	13/16	20,37	.802	20,85	.821
ASC-0375	9,53	3/8	9,27	.365	9,75	.384	ASC-0828	21	53/64	20,78	.818	21,26	.837
ASC-0391	10	25/64	9,73	.383	10,21	.402	ASC-0844	21,43	27/32	21,18	.834	21,67	.853
ASC-0406	10,32	13/32	10,06	.396	10,54	.415	ASC-0859	22	55/64	21,67	.853	22,15	.872
ASC-0422	10,72	27/64	10,47	.412	10,95	.431	ASC-0875	22,22	7/8	21,97	.865	22,45	.884
ASC-0438	11	7/16	10,82	.426	11,30	.445	ASC-0891	22,62	57/64	22,38	.881	22,86	.900
ASC-0453	11,51	29/64	11,25	.443	11,74	.462	ASC-0906	23	29/32	22,76	.896	23,24	.915
ASC-0469	12	15/32	11,71	.461	12,19	.480	ASC-0922	23,42	59/64	23,17	.912	23,65	.933
ASC-0484	12,3	31/64	12,04	.474	12,52	.493	ASC-0938	24	15/16	23,67	.932	24,16	.951
ASC-0500	12,7	1/2	12,45	.490	12,93	.509	ASC-0953	24,21	61/64	23,95	.943	24,44	.962
ASC-0516	13	33/64	12,83	.505	13,31	.524	ASC-0969	24,61	31/32	24,36	.959	24,84	.978
ASC-0531	13,50	17/32	13,23	.521	13,72	.540	ASC-0984	25	63/64	24,69	.972	25,17	.991
ASC-0547	14	35/64	13,72	.540	14,20	.559	ASC-1000	25,40	1	25,15	.990	25,63	1.013
ASC-0562	14,29	9/16	14,02	.552	14,50	.571	ASC-1016	26	1-1/64	25,68	1.011	26,16	1.030
ASC-0578	14,68	37/64	14,43	.568	14,91	.587							

ASC-10 For a complete set of the above Sensing Tips.
Covers the diameter range: 3,18 mm - 25,8 mm (1/8" - 1-1/64").

Alignment Bushings

For Mandrel Centering with adjustable spindle nose

Accurate centering of the mandrel requires a concentric bushing whose I.D. falls within the finish bore limits of the workpiece. **Sunnen truing sleeves are not suitable for this purpose.** Table at right lists the bore diameter and part number of standard alignment bushings.

For bores whose finish size falls between the diameters listed in the table, select the bushing whose bore diameter is just *under* finish size. When setting up the job for the first time, the undersize alignment bushing can be honed out to finish size with the same tooling used for honing the workpiece. For bushing diameters outside the standard range, call your Sunnen representative.

Part No.	Bore Size mm in	Part No.	Bore Size mm in	Part No.	Bore Size mm in	Part No.	Bore Size mm in	Part No.	Bore Size mm in
C-100	2,54 .100	C-160	4,06 .160	C-250	6,35 .250	C-354	8,99 .354	C-619	15,72 .619
C-102	2,59 .102	C-165	4,19 .165	C-255	6,48 .255	C-362	9,19 .362	C-625	15,88 .625
C-104	2,64 .104	C-170	4,32 .170	C-260	6,60 .260	C-370	9,40 .370	C-650	16,51 .650
C-106	2,69 .106	C-175	4,45 .175	C-265	6,73 .265	C-375	9,53 .375	C-681	17,30 .681
C-108	2,74 .108	C-180	4,57 .180	C-270	6,86 .270	C-385	9,78 .385	C-687	17,45 .687
C-110	2,79 .110	C-187	4,75 .1875	C-275	6,99 .275	C-400	10,16 .400	C-713	18,11 .713
C-112	2,84 .112	C-190	4,83 .190	C-280	7,11 .280	C-416	10,57 .416	C-750	19,05 .750
C-114	2,90 .114	C-195	4,95 .195	C-285	7,24 .285	C-432	10,97 .432	C-812	20,62 .8125
C-116	2,95 .116	C-200	5,08 .200	C-290	7,37 .290	C-437	11,10 .4375	C-875	22,22 .875
C-118	3,00 .118	C-205	5,21 .205	C-295	7,49 .295	C-447	11,35 .447	C-937	23,80 .937
C-120	3,04 .120	C-210	5,33 .210	C-300	7,62 .300	C-463	11,76 .463	C-1000	25,40 1.000
C-125	3,18 .125	C-215	5,46 .215	C-308	7,82 .308	C-479	12,17 .479	C-1062	26,97 1.0625
C-130	3,30 .130	C-220	5,59 .220	C-312	7,92 .312	C-495	12,57 .495	C-1125	28,58 1.125
C-135	3,43 .135	C-225	5,72 .225	C-316	8,02 .316	C-500	12,70 .500	C-1187	30,15 1.1875
C-140	3,56 .140	C-230	5,84 .230	C-323	8,20 .323	C-526	13,36 .526	C-1250	31,75 1.250
C-145	3,68 .145	C-235	5,97 .235	C-331	8,40 .331	C-557	14,13 .557	—	—
C-150	3,81 .150	C-240	6,10 .240	C-339	8,61 .339	C-562	14,27 .5625	—	—
C-155	3,94 .155	C-245	6,22 .245	C-347	8,81 .347	C-588	14,93 .588	—	—

KROSSGRINDING® Machine Replacement Parts And Accessories

Replacement Belts

PDB-337	Spindle Belt (KGM-5000)
PDB-327	Spindle Belt (KGM-1000)
PDB-336	Stroker Belt (KGM-1000/5000)
PDB-318	Drive Belt (1000/5000)



KGM Spindle Wrench

PWM-300	Torque Wrench
PWM-301	Wrench Head
PWM-302	Spanner Wrench
EC-6550A	Spindle Runout Indicator

Replacement Fixturing Air Lines

5/32" O.D.

(Sold in 304,8 mm [12"] length only.)

78156A	White	78160A	Yellow
78157A	Black	78161A	Orange
78158A	Red	78162A	Green
78159A	Blue		

CGM-4491A Air Line Retainers with Screw

MMT Adapter

Allows for installation of MMT tooling to KGM

MMT-KGM81A	17mm shank MMT
MMT-KGM82A	23mm shank MMT
MMT-KGM83A	25mm shank MMT

Includes Collet, Collet Nut, Spanner Wrench, Extraction Tool, Wedge Coupler, Spindle Adapter.

(Prior to selecting tooling and adapters, consult with a Sunnen Application Expert.)

Coolant Accessories

CGM-3205A	Coolant Nozzle Set
CGM-3201A	Coolant Hose 914,4 mm (3 ft.)

Lubricating Oils KGM-5000

SML-10 Spindle Oil
(Mobil SHC-626) ,47 liter (1 Pint)

Lubricating Grease for KGM-5000

SML-170 Lubricating Grease
Lubricating Grease for KGM-5000 (Polyrex Em)
,41 liter (14 oz.) Tube



SML-100 Lubricating Grease
(MobilTemp™ SHC-32 or MobilGrease™ 28)
,41 liter (14 oz.) Tube

Note: Use of any other oils or lubricants will cause component failure.

Optional Fixturing for KGM-5000 KROSSGRINDING® Machine

CGM-4200 Automatic Finger Fixture

The air-actuated CGM-4200 Automatic Finger Fixture is a versatile fixturing system that can be used for either manually loading or automating the KGM Machine.

CGM-4210A

Air-Actuated Finger Assembly

Used in place of CGM-4201A Fixed Finger Set.

CV616/SV-10

Accessories and Supplies

SV-10 Replacement Belts

Part Number	Description
PDB-341	Stoker Drive Belt
PDB-342	Spindle Drive Belt
CK-252	Timing Belt

CV-616 Replacement Belts

Part Number	Description
CK-252A	Timing Belt
CK-192A	Flat Belt
CK-209A	"V" Belt, Upper
CK-498A	"V" Belt, Lower



CV-1100 Fiber Mats

These mats remove the coarse swarf produced during honing before it enters the machine sump. They extend the time between cleaning the machine sump and also extend filter and pumping system life. Five to the standard package. Measures 134 x 86 cm (53" x 34").

Feed System-CV-616/SV-10

CK-125A Feed Ratchet Pawl Replacement Kit

Replaces work Feed Ratchet Pawl.

CV-616-HN2X 1/2 Rate Pawl Kit

Reduces feed rate by 1/2 for applications (superabrasives and carbide or tool steel) which the standard feed rate does not advance slow enough for wear and load builds. Replaces standard on machine feed pawls.



CK-234A Gear Set

Replacement Fiber planetary gear set for the CV-616/SV-10 handwheel assembly.

Cover for Operator Station Screen — SV-10

CV-605B

Replacement protective cover for screen.

PF-244A

Gasket for filter canister lid CV616/SV-10.

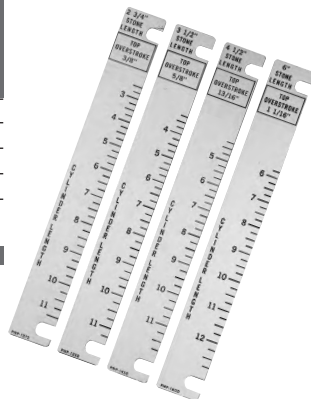
Stroke Scale Plates

CV616/SV-10

Stroke Scale Plates for CV-616 Cylinder King

Part Number	Stone Length
PNP-12752	3/4" (69, 8 mm)
PNP-13503	1/2" (88, 9 mm)
PNP-14504	1/2" (114, 3 mm)
PNP-1600	6" (152, 4 mm)
CV-1285 (not shown)	9" (228, 6 mm)

For metric, add "M" to the part number.



SV10 Replacement Belts

Part Number	Description
CK-125A	Ratchet Pawl Replacement Kit
CV-616-HN2X	1/2 Rate Pawl Kit
CV-605B	Replacement Protective Cover for SV-10 Operator Screen

CK-3410A Lamp and Bracket Assembly

The CK-3410A is equipped with an 8-foot long cord with moulded on ground plug. It is offered in 115 volt, single phase only and will plug into any standard 3-wire convenience outlet. The unit is supplied with a clamp for attachment to the control station arm. (Takes 100 watt maximum incandescent bulb; bulb not included.)
Shipping Weight: 3,2 kg (7 lbs.)



CK-448A Gearbox Oil

CK-448A is a sulphur free gearbox lubricant used in the CV-616/SV-10 transmission case. Use of 90 weight hypoid lubricant will cause premature gearbox wear and is not recommended.



FL6X-20 MPS or Portable Tooling Adapter for CV-616/CK-21/SV-10

For use on applications larger than 8" in diameter or for parts with keyways, ports or other interruptions where standard CV/CK tooling will not work. Order MPS or ANR hone heads separately - Special Order. Please call Sunnen for availability.
Shipping weight: 3 kg (6.5 lbs.)



CV-1010 Mandrel Adapter

The CV-1010 adapts standard mandrels in applications where the standard hone heads do not apply. Minimum diameter 19 mm (.75"). Mandrel not included.
Shipping Weight: 2,3 kg (5 lbs.)



CV-271A Over Arm Counterbalance Weight Block

For CV-616 Serial No. 4358 and above. Order when using large hone heads, large P28 and Y mandrels. Helps keep head in position when tool is removed from bore.
Does not fit SV10 Machines.

CV-1220A Cradle Counterweight Kit

Attached to the CV-616/SV-10 cradle, this kit reduces the effort required to shift the cradle when changing from its vertical or horizontal positions.

SV-1000/2000 Series

Tooling Adapters and Accessories

Tooling Adapters

NOTE:

Tooling selection is application dependent. Prior to selecting tooling and adapters, consult with a Sunnen application expert.

MMT

Part Number	Description
MMT-SCN	Collet Nut
MMT-SCE	Collet Extractor
MMT-SCW	Collet Nut Wrench
MMT-SC1	17mm Tool Shank Collet
MMT-SC2	23mm Tool Shank Collet
MMT-SC3	25mm Tool Shank Collet
MMT-SC4	16mm Tool Shank Collet
SV-39150	Runout Adjustable Collet Adapter (for use with MMT-SCX collets)
SV-39170	Runout Adjustable Large MMT Adapter (50mm shank)
SV-39210	Floating Tool Holder - MMT Up to 17mm Shank
SV-39220	Floating Tool Holder - MMT Up to 25mm Shank

CGT

Part Number	Description
SV-39010	CGT Spindle Adapter
PWM-300	Torque Wrench (pre set to 45 ft-lbs)
PWM-301	7/8" Wrench Head (for use with PWM-300)
PWM-306	Hook Spanner

Single Stroke

Part Number	Description
SV-39230	Floating Tool Holder for Single Stroke Tooling

Standard Tooling - K, KR, L, LR, BL, D2, JK, AK, Y, P20, P28

Part Number	Description
SV-39030	Standard Tooling Adapter

Spindle Tool

Part Number	Description
SV-39080	Used to Remove Ball Coupler for CGT Installation and to Lock Spindle While Tightening MMT Collet Nut

Tool Alignment Indicator

Part Number	Description
SV-39040	Mounts to column

Work Area Light Kit

VSS-29050

SV-400/2400 Series

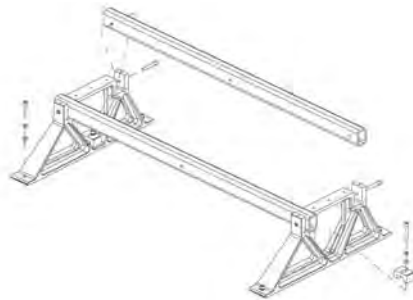
Accessories

CV-1010

Mandrel Adapter (same as SV-10) - Adapts standard mandrels to spindle

SV-21110

Fixture Frame for Mounting Custom Work Piece Fixtures



NOTE: SV21115 fixture frame is available for SV410/2410 machines and includes T-slot base

SV-51117

T-Slot Table — Mounts to Base of Machine. Allows for Use of T-Nuts to Mount Work Piece Fixtures. Optional for SV410/2410 only.

VSS-29050

Work Area Light Kit

Item Number	Order by Part Number	QTY.	Description
-	SV-21110	-	- Fixture Frame, Optional includes
1	PHSM-452	4	- Screw, M12 x 1.75 x 35mm SHCS
2	PHSM-809	6	- Screw, M12 x 80mm SHCS
3	PHWM-408	6	- Lockwasher, M12
4	PHWM-549	6	- Flatwasher, M12
5	SV-21102	2	- Fixture Support
6	SV-21103	2	- Fixture Anchor
7	SV-26093	2	- Rail
Optional	SV26220	1	Servo Rollover Cradle (2) SV21102 fixture supports
Optional	SV26250	1	Man. Rollover Cradle (2) SV21102 fixture supports
Optional	CK6200	-	Clamp Kit can be used with any of these fixtures

SV-1000/2000/400/2400 Series

Maintenance

SV-1000/300/400 Maintenance

Part Number	Description
90123	Ball Screw Grease - Kluberplex 1 kg Can (SV-1000/310)
SV-32820A	Replacement Way Cover (SV-1000/310)
PFC-150-1	Replacement Air Filter for MVH-7120 Air Unit

Belts

Part Number	Description
SV-23119	SV-310 Motor Belt (upper)
SV-23118	SV-310 Spindle Belt (lower)
PDB-217	SV-1000 Series Spindle Motor & Ball Spline Belt (2 REQD per column)

VSS & VSS Series 2

Tooling Adapters (VSS and VSS Series 2)

Part Number	Description
VSS-9110	Runout Adjustable Spindle Adapter
VSS-9115	Floating Tool Holder Adapter

Work Area Light Kits

VSS-6170	for VSS Machines
VSS-29050	for VSS Series 2 Machines

Tool Alignment Indicator

SV-39040 for VSS Series 2

Maintenance

Belts

VSS:	
Part Number	Description
PDB-215	Column Timing Belt VSS-84/64/86
PDB-107	Intermediate Spindle Drive Belt VSS-86
PDB-106	Main Spindle Drive Belt VSS-86

VSS Series 2:

Part Number	Description
PDB-220	Spindle Drive Belt VSS-284/64
PDB-219	Spindle Drive Belt VSS-286

Lubrication

VSS:	
Part Number	Description
SML-130	VSS-84/64 Spindle Gear Case
SML-150	VSS-84/64/86 Indexer Oil
SML-160	Column Ball Nut

VSS Series 2:

Part Number	Description
90056	Column Grease
SML-150	Indexer Oil

Column Drive Shear Pin

VSS-4273 (VSS machines only)

PG Bore Gaging System

Diameter Range:
2,29 mm – 109,47 mm
.090" – 4.310"

The Sunnen "PG" Bore Gaging System is a unique mechanical gaging system that makes I.D. Gaging simple, reliable, and economical. Eliminates buying and maintaining costly master rings and air gage probes. Both gage and setting fixture are built for everyday use making them ideal for "in-process" inspection. Available in .001 mm or .0025 mm (.00005" or .0001") reading scales.



PG-710E Small Bore Precision Gage with PG-400E Setting Fixture



PG-700E Small Bore Precision Gage

Diameter Range:
2,29 mm-9,63 mm
(.090"-.379")*

Direct reading scale with , 13 mm (.005") range divided into increments of ,001 mm (.00005").
Order PG-700EM for metric applications.
Weight: 9,3 kg (20.5 lbs.)
Dimensions (without fingers): 267 mm x 197 mm x 165mm (10.5" H x 7.75" W x 6.5" D)

*Covered with complete set of gaging fingers. Individual finger sets can be ordered for specific sizes. Order individual finger sets from the complete list at right.

PG-710E Small Bore Precision Gage

Identical to PG-700 except direct reading scale is ,24 mm (.010") wide and divided into increments of ,0025 mm (.0001"). Order PG-710EM for metric applications.

Gaging Fingers for PG-700 or PG-710 Precision Gage

To order individual finger pairs, consult the table below for size ranges and part numbers.

Each pair of gaging fingers is stamped with its size range and comes nested in an impact-resistant box. Available for sale only.



Diameter Range		Gaging Depth*		Accessory Fingers
mm	inches	mm	inches	
2,29-2,51	.090-.099	7,14	.281	PG-1090
2,51-2,77	.099-.109	7,14	.281	PG-1099
2,77-3,05	.109-.120	7,14	.281	PG-1109
3,05-3,35	.120-.132	12,70	.500	PG-1120
3,35-3,68	.132-.145	12,70	.500	PG-1132
3,68-4,04	.145-.159	15,87	.625	PG-1145
4,04-4,42	.159-.174	15,87	.625	PG-1159
4,42-4,83	.174-.190	19,05	.750	PG-1174
4,83-5,26	.190-.207	19,05	.750	PG-1190
5,26-5,72	.207-.225	22,22	.875	PG-1207
5,72-6,20	.225-.244	22,22	.875	PG-1225
6,20-6,71	.244-.264	25,40	1.000	PG-1244
6,71-7,24	.264-.285	25,40	1.000	PG-1264
7,24-7,80	.285-.307	31,75	1.250	PG-1285
7,80-8,38	.307-.330	31,75	1.250	PG-1307
8,38-9,00	.330-.354	38,10	1.500	PG-1330
9,00-9,63	.354-.379	38,10	1.500	PG-1354
COMPLETE SET of all Gaging Finger Pairs. Each finger set comes in an individual plastic case. Weight: 9 kg (20 lbs.)				PG-1401

Individual Gaging Finger Shipping Weight: ,2 kg (.5 lb.)

*If bore can be measured from both ends, bore length can be double the gaging depth shown.

Blind Hole Gaging Fingers for PG-700/PG-710 Gages

Special Blind Hole Gaging Fingers are available on special order basis. These fingers are non-adjustable and can only be used for a specific diameter size. These altered blind hole fingers can measure to within 1,02 mm (.040") of the bottom of the blind end of the bore. Recommend customer use a ring gage to set size on the gage.

How to order blind hole gaging fingers:

PG-____ - ____ - HMOX The first ____ is the four-digit number of the standard gaging fingers for the diameter needed to be measured. The second ____ is the finished diameter of the bore to be measured, either in English or Metric units.

Examples: 2,89 mm diameter. Order: PG-1109-2,890-HMOX
.2092" diameter. Order: PG-1202-2092-HMOX

Available 4 weeks after receipt of order.

PG Bore Gaging System

PG-800E Precision Bore Gage

Diameter Range: 9,4 mm – 38,1 mm {.370" – 1.500"}

Direct reading scale with .13 mm (.005") range divided into increments of .001 mm (.00005"). Overall size range is divided into two subranges 9,4 mm-19,05 mm (.370"-.750") and 19,05 mm-38,1 mm (.750"-1.500"). Replaceable carbide gage points which can be rotated for long life. Size range can be increased to 74,3 mm (2.9") by ordering PG-250 Extension Finger Set.

Order **PG-800EM** for metric applications.
Dimensions: 267 x 197 x 213 mm (10-1/2" H x 7-3/4" W x 8-3/8" D)
Gaging Depth:
Small Side - 24,6 mm (.968")
Large Side - 42,06 mm (1.656")
With PG-250 - 41,27 mm (1.625")
Weight: 9,2 kg (20.25 lbs.)



PG-800E

PG-810E Precision Bore Gage

Identical to PG-800 except direct reading scale is .24 mm (.010") wide and divided into increments of .0025 mm (.0001"). Order **PG-810EM** for metric applications.

PG-250E Extension Finger Set

Used with the PG-800 and PG-810 Precision Bore Gages. Extends the PG-800/PG-810 measuring range from 38,1 mm (1.500") to over 74,3 mm (2.900") diameter. Consists of two pairs of carbide extension points which mount onto the fingers of the PG-800/PG-810. Mounting screws are permanently attached to extension points to avoid their loss.
FOR SALE OR LEASE



GAGE LEASING PROGRAM

Sunnen PG-700, PG-800 Series Gages, Setting Fixtures, and PG-250 Extension Fingers are also available on a unique lease plan. Leasing the Sunnen bore gaging system includes maintenance and updating by Sunnen. Contact KS & C Industries 1-800-247-7098 for complete leasing information.

Note: This program is not available outside of the United States.

PG-400E Setting Fixture

Diameter Range: 2,29 mm – 38,3 mm {.090" – 1.500"}



This Setting Fixture is used to set the PGE-3000, PG-800, PG-810, PG-700 and PG-710 Precision Bore Gages. Dimensional accuracy is guaranteed to be within $\pm .0006$ mm (.000025") of nominal reading over the entire range of the instrument. Comes in a carrying case with a master calibrating ring traceable to the Bureau of Standards.

Order **PG-400EM** for metric applications.
Weight: 3 kg (6.75 lbs.) (with carrying case and accessories)

PG-500E Setting Fixture

(Not pictured-similar to PG-400)

Diameter Range: 37,7 mm – 74,3 mm {1.500" – 2.900"}

Similar to PG-400, except for higher range. Used to set PG-800 or PG-810 Precision Bore Gage when equipped with PG-250 Extension Fingers. Comes in a carrying case with a master calibrating ring traceable to the Bureau of Standards. Includes PG-2090 Auxiliary Faceplate.

Order **PG-500EM** for metric applications.
Weight: 4,3 kg (9.5 lbs.) (with carrying case and accessories)

PGE-500 Setting Fixture

Identical to PG-500E Setting Fixture. Use to set PGE-3000 Precision Bore Gage when equipped with PGE-250 Extension Fingers. Includes PGE-3167 Auxiliary Faceplate.

Order **PGE-500EM** for metric applications.

PG-810-Z08X Precision Bore Gage

Diameter Range: 76,2 mm – 114,3 mm {3.0" – 4.5"}

Available for purchase only. PG-810-Z08X is similar to the PG-810 Precision Bore Gage.

Diameters 76,2 mm-95,25 mm (3.0"-3.750") are measured on one side.
Diameters 95,25 mm-114,3 mm (3.750"-4.5") are measured on the opposite side.
Dimensions: 267 x 197 x 222 mm (10-1/2" H x 7-3/4" W x 8-3/4" D)
Order **PG-810M-Z08X** for metric applications.
Weight: 9,54 kg (21 lbs.)



PG-810-Z08X

PG-500-U100Z

PG Bore Gaging System

PG-500-U100X Setting Fixture for PG-810-Z08X

(Similar to PG-500 Setting Gage.)

Diameter Range: 73,40 mm – 109,47 mm {2.890" – 4.310"}

Used to set 76,2 mm-109,47 mm (3.0"-4.310") diameter range on PG-810-Z08X.

Also used with PG-800 Series Gage with PG-250 Extension Fingers and PG-2090-AM1X Auxiliary Face Plate to set diameters 73,4 mm-76,2 mm (2.890"-3.0"). Setting size on PG-810-Z08X from 109,47 mm-114,3 mm (4.310"-4.5") must be done utilizing ring gages or gage blocks.

Order **PG-500M-U100X** for metric applications.

Shipping Weight: 7,7 kg (17 lb.)

PG-810-Z08X and **PG-500-U100X** available from stock (limited quantity available). *PG-2090-AM1X* available three weeks after receipt of order.

PG-845 Tilting Gage Stand

A recommended accessory for the PG-810-Z08X Precision Gage. Lets the gage faceplate support the majority of the part weight. Used also with PGE-3000, PG-800/PG-810. Attaches to MB-2370 Gage Mounting Bracket.

Weight: 2,1 kg (4.5 lbs.)



PG Bore Gaging Accessories

Replacement Gage Points for PG-800 and PG-250

PG-712A Point Set	Consists of Three Carbide Gaging and Three Mounting Screws for 18,8 mm-38,1 mm (.740"-1.500") diameter gaging fingers. Also used on non-centralizer gaging fingers on PG-250 Extension Finger Set.
PG-714A	Consists of Three Carbide Gaging and Three Point Set Mounting Screws for 9,4 mm-18,8 mm (.370"-.740") diameter gaging fingers.
PG-1007	Eccentric Centralizer with carbide ring used on both centralizer extension fingers of the PG-250 Extension Finger Set.
PG-110A	Gage Point Removal and Installation Tool 9,4 mm-18,8 mm (.370"-.740").
PG-90A	Gage Point Removal and Installation Tool 18,8 mm-38,1 mm (.740"-1.500").
PG-120A	Tolerance Flag Adjusting Wrench.

Blind Hole Gaging Points for PG-800 and PG-250

PG-702A Blind Hole Point Set	Consists of Three Points and Screws 18,8 mm-38,1 mm (.740"-1.500"). Also used on non-centralizer gaging fingers on PG-250 Extension Finger Set.
PG-704A Blind Hole Point Set	Consists of Three Points and Screws 9,4 mm-18,8 mm (.370"-.740") diameter gaging fingers.
PG-LR6X Blind Hole Point Set	For PG-250 Extension Finger Set 38,1 mm-74,3 mm (1.5"-2.9")

Note: Blind hole point sets measure to within 0,25 mm (.010") of the bottom of the blind hole.

PG-LR6X available four weeks after receipt of order.

PG-2130 Flexible Hex Wrench

Use to dampen vibration when centralizing PG-400 on the PG-700/710 Precision Gage.

PG-2110 Clip-On Auxiliary Faceplate

For PG-700/710 Precision Gage.



PG-4



PG-5



PG-6

Additional PG Gage Faceplates.

PG-4 Auxiliary Faceplate for PG-700/PG-710. A flat plate with ten holes designed to slip over the gaging fingers of a PG-700/PG-710. Reduces the opening size of the PG-2110 faceplate making it easier to measure thin walled parts. Hole sizes on PG-4 vary from 2,77 mm-8,71 mm (.109"-.343").

PG-10A Auxiliary Faceplate set for PG-800/PG-810 Precision Gage. Consists of one PG-5 and PG-6 Faceplate similar to PG-4. PG-5 hole size 18,3 mm (.720"), 20,8 mm (.820"), and 23,4 mm (.920"). PG-6 hole size 9,7 mm (.380"), 10,9 mm (.430"), 12,2 mm (.480"), 13,5 mm (.530"), 14,7 mm (.580"), 16,0 mm (.630"), and 17,3 mm (.680").



PG-25 Magnifying Glass

With spring clip. Made of 2.5x ground optical glass with a spring clip for mounting on PG-700 or PG-800 precision gage.

Gage Mounting Brackets

Recommended when any Sunnen Precision Bore Gage is used on a Sunnen Honing Machine. Mounting brackets reduce lost motion and fatigue and reduce runoff of honing oil.

Available for either right or left side mounting. All models adjustable for easiest access to gage.

To order, specify from chart.

Model No.	Description
MB-1325	For Right Side of MB-1290, MBB-1290, MBB-1600, MBB-1650, or MBB-1660. Weight: 4,5 kg (10 lbs.)



Model No.	Description
MB-2370	For Left or Right Side of MBB-1650 or MBB-1660; Left Side of MBB-1670, MBB-1680, MBB-1690, MBB-1800, MBC-1800, MBC-1801, MBC-1802, MBC-1803, MBC-1804, MBC-1805. Weight: 5,5 kg (12 lbs.)



MB-1250	For Left Side of MB-1290, MBB-1290, MBB-1600. Weight: 4,5 kg (10 lbs.)
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EC-7170	For Right Side of EC-3500 and ML models.
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Dial Bore Gages

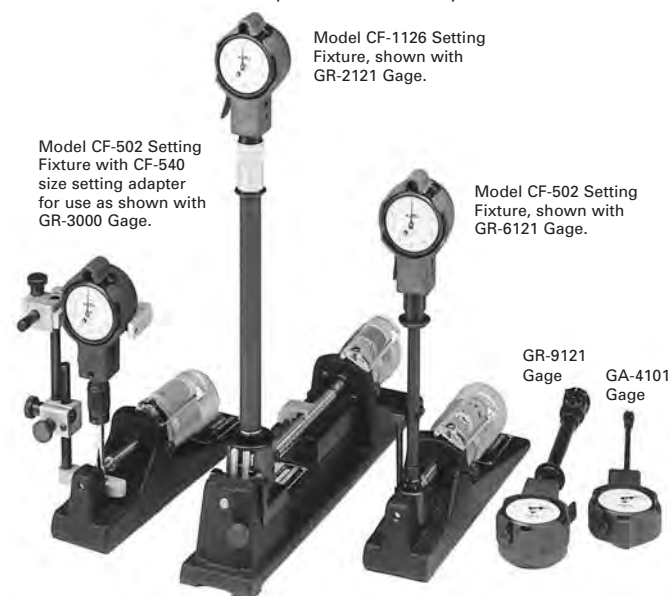
GR-3000 Dial Bore Gage Accessories

Diameter Range:
1,37 mm – 304,8 mm
.054" – 12.0"

FAST • EASY • ACCURATE-gages and setting fixtures.

All Sunnen Dial Bore Gages read out in .002 mm (or .0001")* and feature all-carbide gaging points, wear-proof ball crank, and adjustable centralizers. Each gage comes packed in its own sturdy box with all tools and wrenches required for setup and adjustment.

*(.010 mm [.0005"] reading gages are also available. Contact Customer Service for price and availability.)



GRM/GR-3000 Dial Bore Gage

Diameter Range: 1,37 mm – 13,6 mm {.054" – .535"}

Assembly consists of a .002 mm reading indicator, probe retractor and probe retainer bushing in a reinforced nylon insulating shroud.

Order **GR-3000** for .0001" reading.
Shipping Weight: 1 kg (2 lbs.)



Gage Probes and Transfer Pins



Probes and pins must be ordered separately. Diameter ranges, gaging depths and part numbers are listed below.

Probe and Matching Transfer Pins

For GRM/GR-3000 (order separately)

G-3005A Probe and Transfer Pin Storage Case

Diameter Range		Probe No.	Transfer Pin No.	Max. Gaging Depth		Overall Length	
mm	in			mm	in	mm	in
1,37 - 1,55	.054 - .061	G-1055	G-2037	11	.43	167	6.6
1,50 - 1,90	.059 - .075	G-1070	G-2059	16	.63	174	6.9
1,80 - 2,20	.071 - .087	G-1080		16	.63	174	6.9
2,05 - 2,45	.081 - .096	G-1090		16	.63	174	6.9
2,25 - 2,75	.089 - .108	G-1100		21	.82	179	7.1
2,50 - 3,00	.098 - .118	G-1110	G-2089	21	.82	179	7.1
2,75 - 3,25	.108 - .128	G-1120		21	.82	179	7.1
3,00 - 3,50	.118 - .138	G-1130		21	.82	179	7.1
3,25 - 3,75	.128 - .148	G-1140		21	.82	179	7.1
3,50 - 4,00	.138 - .157	G-1150		21	.82	179	7.1
3,75 - 4,25	.148 - .167	G-1160		21	.82	179	7.1
4,20 - 4,80	.165 - .189	G-1180		39	1.53	195	7.7
4,70 - 5,30	.185 - .209	G-1200		39	1.53	195	7.7
5,20 - 5,80	.205 - .228	G-1220	G-2264	39	1.53	195	7.7
5,70 - 6,30	.224 - .248	G-1240		39	1.53	195	7.7
6,20 - 6,80	.244 - .268	G-1260		39	1.53	195	7.7
6,70 - 7,30	.264 - .287	G-1280		39	1.53	195	7.7
7,20 - 7,80	.283 - .307	G-1300		39	1.53	195	7.7
7,70 - 8,30	.303 - .327	G-1320		39	1.53	195	7.7
8,20 - 8,80	.323 - .346	G-1340		39	1.53	195	7.7
8,70 - 9,30	.343 - .366	G-1360		39	1.53	195	7.7
9,20 - 9,80	.362 - .386	G-1380		39	1.53	195	7.7
9,40 - 10,60	.370 - .417	G-1400		46	1.81	195	7.7
10,40 - 11,60	.409 - .457	G-1440	G-2370	46	1.81	195	7.7
11,40 - 12,60	.449 - .496	G-1480		46	1.81	195	7.7
12,40 - 13,60	.488 - .535	G-1520		46	1.81	195	7.7

ADAPTERS & OTHER
ABRASIVES & TOOLING

MACHINE
ACCESSORIES

GAGING

FILTERS

HONING FLUIDS
& COOLANTS

TECHNICAL DATA

Dial Bore Gages

GR-3000 Dial Bore Gage Accessories

Probe Extension*

Available for probes 8,2 mm (.323") or larger. Probe extensions are 63,5 mm (2 1/2") long, and up to three can be assembled together. Part Number: **KZ1X-3500**.

Blind Hole Probes and Transfer Pins

Order standard probe and transfer pin number and add **-KZ0X** to number. Example: **G-1240-KZ0X**.

NOTE: G-1055 probe and G-2037 transfer pin not available in blind hole configuration. Available 4 weeks after receipt of order.

Carbide Inserted Gage Probes and Transfer Pins

For applications where gage points are exposed to extreme wear conditions such as heavy production, rough workpieces or abrasive materials. Not available in sizes smaller than 4,2 mm (.165").

Order standard probe and transfer pin number and add **-KY5X** to number. Example: **G-1240-KY5X**. Available 2-4 weeks after receipt of order.

Probe Kits

Probe kits to cover the more popular diameters are available as listed below. Both kits are supplied in a hinged, nested box.

G-3025 Probe Kit

Consists of 15 probes and 2 transfer pins. Covers a continuous diameter range from 4,2 mm-13,6 mm (.165"-.535").
Shipping Weight: ,2 kg (.5 lb.)



Probe No.	Diameter Range		Transfer Pin No.
	mm	in	
G-1180	4,20/4,80	.165/.189	G-2264
G-1200	4,70/5,30	.185/.209	
G-1220	5,20/5,80	.205/.228	
G-1240	5,70/6,30	.224/.248	
G-1260	6,20/6,80	.244/.268	
G-1280	6,70/7,30	.264/.287	
G-1300	7,20/7,80	.283/.307	
G-1320	7,70/8,30	.303/.327	
G-1340	8,20/8,80	.323/.346	
G-1360	8,70/9,30	.343/.366	G-2370
G-1380	9,20/9,80	.362/.386	
G-1400	9,40/10,60	.370/.417	
G-1440	10,40/11,60	.409/.457	
G-1480	11,40/12,60	.449/.496	
G-1520	12,40/13,60	.488/.535	

G-3050 Probe Kit

Consists of 6 probes and 2 matching transfer pins which cover a 4,2 mm-13,6 mm (.165"-.535") diameter range on even 1/16" increments.
Shipping Weight: ,2 kg (.5 lb.)



Probe No.	Diameter Range		Transfer Pin No.
	mm	in	
G-1180	4,20/4,80	.165/.189	G-2264
G-1260	6,20/6,80	.244/.268	
G-1320	7,70/8,30	.303/.327	
G-1380	9,20/9,80	.362/.386	
G-1440	10,40/11,60	.409/.457	G-2370
G-1520	12,40/13,60	.488/.535	

Right Angle Attachment*

Available for special conditions where it is difficult to read the gage or the total gage height causes a problem. Part Number: **KZ1X-90**.

*Standard CF-502 Setting Fixture nest does not work with these accessories. Alternative methods of setting size must be used. Available 4 weeks after receipt of order.

CF-540 Size Setting Adapter

Centers gage probes between parallel reference surfaces on CF-502 Setting Fixture. Serves as an "extra pair of hands" to help in nulling the gage on both the horizontal and vertical axis. Assures fast, accurate setup of the gage.

Shipping Weight: 1 kg (2 lbs.)



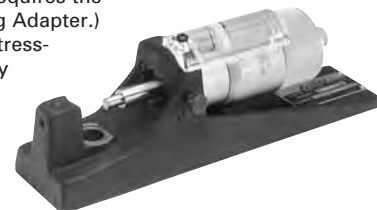
Shown with CF-502 Setting Fixture.

Setting Fixtures

CF-502M (metric) 1,37 mm-50,8 mm
CF-502 (inch) .054"-2.00"

For use with 3000, 4000, 6000, and 9000 Series Dial Bore Gages.

CF-502M comes with 0-51 mm micrometer head marked in .002 mm increments with precision lapped carbide anvils. Includes a ring gage checking standard and three interchangeable nests. (Use of CF-502M/CF-502 with 3000 series gage requires the purchase of CF-540 Size Setting Adapter.) Setting Master has a rugged, stress-relieved cast-iron base and may be used without removing it from its protective case. CF-502 is equipped with a 0"-2" micrometer head marked in .0001" increments.
CF-502M/CF-502 Shipping Weight: 4,5 kg (10 lbs.)



Replacement Gage Nests For CF-502M Metric & CF502:

CF-502M	12,6 mm-19,1 mm
	18,8 mm-30,2 mm
	30,0 mm-50,0 mm
CF-502	CF-550A .495"-.750"
	CF-560A .740"-1.19"
	CF-570A 1.18"-2.00"
CF-137	Micrometer Adjusting Wrench
CF-138	Spindle Lock Knob
CF-544A	Magnifier
CF-576A	Calibration Ring

Dial Bore Gages

GAM/GA-4000 Series Gages

Diameter Range:

12,6 mm – 19,0 mm { .495" – .750" }

Non-retractable gage with .002 mm metric or (.0001") reading indicator. Capable of measuring to within 5,0 mm (.200") of the bottom of a blind hole. Indicators reading in .010 mm or .0005" are available on special order.



GRM/GR-6000 Series Gages

Diameter Range:

18,8 mm – 30,2 mm { .740" – 1.190" }

Retractable gage with .002 mm metric or (.0001") reading indicator. Capable of measuring to within 6,8 mm (.270") of the bottom of a blind hole. Indicators reading in .010 mm or .0005" are available on special order.



Part Number		Max. Gaging Depth		Overall Length		Shipping Weight	
Metric	Inches	mm	in	mm	in	kg	lbs
GAM-4051	GA-4051	62	2 1/2	187	7 5/16	,7	1.5
GAM-4101	GA-4101	125	5	251	9 13/16	,7	1.5
GAM-4141	GA-4141	175	7	302	11 13/16	,7	1.5

Part Number		Max. Gaging Depth		Overall Length		Shipping Weight	
Metric	Inches	mm	in	mm	in	kg	lbs
GRM-6071	GR-6071	88	3 1/2	235	9 3/16	1	2
GRM-6121	GR-6121	150	6	298	11 11/16	1	2
GRM-6241	GR-6241	300	12	451	17 11/16	1	2

Replacement Parts For GAM/GA-4000 Series Gages:

G-275MA	Quick Setting Wrench (Metric reading)
G-275A	Quick Setting Wrench (Inch reading)
G-285A	Indicating Ball Removal Tool
G-289A	Indicating Finger Clamp
PBR-505A	Indicating Ball (1/16" Diameter Carbide)
G-222A	Centralizer Points (Package of 2)
G-261MA	#1 Point Assembly (metric) 12,6 mm-14,7 mm diameter
G-261A	#1 Point Assembly (inch) .495"-.580" diameter
G-262MA	#2 Point Assembly (metric) 14,7 mm-16,9 mm diameter
G-262A	#2 Point Assembly (inch) .580"-.665" diameter
G-263MA	#3 Point Assembly (metric) 16,9 mm-19,0 mm diameter
G-263A	#3 Point Assembly (inch) .665"-.750" diameter
G-249A	Nuts for Point Assembly (Package of 3)
G-249MA	Metric Nuts for Point Assembly (Package of 3)

Special Length Dial Bore Gages are available on a special order basis. GA/GAM-4000 Indicator cannot be peaked at lengths longer than 175 mm (7") therefore gage accuracy is compromised.

To order special length dial bore gages, specify as follows:

GA/GAM-4_1X. The _ is the desired gaging length multiplied by 2 (in inches). Available 4 weeks after receipt of order.

Replacement Parts For GRM/GR-6000 Series Gages

G-375MA	Quick Setting Wrench (Metric reading)
G-375A	Quick Setting Wrench (Inch reading)
G-385A	Indicating Ball Removal Tool
G-389A	Indicating Finger Clamp
PBR-506A	Indicating Ball (3/32" Diameter Carbide)
G-327A	Centralizer Points (Package of 2)
G-361MA	#1 Point Assembly (metric) 18,8 mm-22,6 mm diameter
G-361A	#1 Point Assembly (inch) .740"-.890" diameter
G-362MA	#2 Point Assembly (metric) 22,6 mm-26,4 mm diameter
G-362A	#2 Point Assembly (inch) .890"-1.04" diameter
G-363MA	#3 Point Assembly (metric) 26,4 mm-30,2 mm diameter
G-363A	#3 Point Assembly (inch) 1.04"-1.19" diameter
G-349A	Nuts for Point Assembly (Package of 3)
G-349MA	Metric Nuts for Point Assembly (Package of 3)

Special Length Dial Bore Gages are available on a special order basis. GR/GRM-6000 Indicator cannot be peaked at lengths longer than 305 mm (12") therefore gage accuracy is compromised.

To order special length dial bore gages, specify as follows: GR/GRM-6_1X. The _ is the desired gaging length multiplied by 2 (in inches). Available 4 weeks after receipt of order.

CF-502 Setting Fixture

Metric version CF-502M has a 0 to 51 mm

Micrometer head marked in .002 mm increments. Supplied in a sturdy, nested box.

CF-502 for .054" to 2.000" diameters is equipped with a large micrometer head with range of 0" to 2" marked in .0001" increments.



Shown with GR-6121 Gage.

Gage Point No.	Diameter Range	
	mm	in
1	50-60	2.000-2.375
2	60-70	2.375-2.750
3	70-79	2.750-3.125
4	79-89	3.125-3.500
5	89-98	3.500-3.875
6	98-108	3.875-4.250
7 + 2	108-117	4.250-4.625
7 + 3	117-127	4.625-5.000
7 + 4	127-137	5.000-5.375
7 + 5	137-146	5.375-5.750
7 + 6	146-150	5.750-6.000

Dial Bore Gages

GRM/GR-9000 Series Gages

Diameter Range:
30,0 mm – 50,8 mm {1.18" – 2.0"}

Retractable gage with ,002 mm metric or (.0001") reading indicator. Capable of measuring to within 8,5 mm (.335") of the bottom of a blind hole. Indicators reading in ,010 mm or ,0005" are available on special order.



Part Number		Max. Gaging Depth		Overall Length		Shipping Weight	
Metric	Inches	mm	in	mm	in	kg	lbs
GRM-9071	GR-9071	88	3 1/2	237	9 1/4	1,8	4
GRM-9121	GR-9121	150	6	300	11 3/4	1,8	4
GRM-9241	GR-9241	300	12	452	17 3/4	1,8	4

Replacement Parts For GRM/GR-9000 Series Gages:

G-475MA	Quick Setting Wrench (Metric reading)
G-475A	Quick Setting Wrench (Inch reading)
G-485A	Indicating Ball Removal Tool
G-489A	Indicating Finger Clamp
PBR-503A	Indicating Ball (1/8" Diameter Carbide)
G-427A	Centralizer Points (Package of 2)
G-461MA	#1 Point Assembly (metric) 30,0 mm-35,2 mm diameter
G-461A	#1 Point Assembly (inch) 1.18"-1.385" diameter
G-462MA	#2 Point Assembly (metric) 35,2 mm-40,4 mm diameter
G-462A	#2 Point Assembly (inch) 1.385"-1.59" diameter
G-463MA	#3 Point Assembly (metric) 40,4 mm-45,6 mm diameter
G-463A	#3 Point Assembly (inch) 1.59"-1.795" diameter
G-464MA	#4 Point Assembly (metric) 45,6 mm-50,8 mm diameter
G-464A	#4 Point Assembly (inch) 1.795"-2.0" diameter
G-449A	Nuts for Point Assembly (Package of 4)
G-449MA	Nuts for Point Assembly (Metric) (Package of 4)

Special Length Dial Bore Gages are available on a special order basis. GR/GRM-9000 Indicator cannot be peaked at lengths longer than 635 mm (25") therefore gage accuracy is compromised.

To order special length dial bore gages, specify as follows: GR/GRM-9_1X. The _ is the desired gaging length multiplied by 2 (in inches). Available 4 weeks after receipt of order.

Note: Sunnen 2000 Series Dial Bore Gages can be extended to 304,8 mm (12") by adding oversize centralizer points and additional gage point extensions.

For gaging diameters in the range of 152,4 mm-304,8 mm (6"-12") order: G-822A Gage Extension Kit. Consists of: Two Oversize Centralizer Points, G-632A #7 Gage Point Extension, G-634A #8 Gage Point Extension.

2000 Series Gages assembled with G-822A Gage extension set cannot be used with CF-1126 setting fixture when set for diameters above 203,2 mm (8"). Alternative methods of setting gage must be used.

G-822C Centralizer Point Only.

GAM/GA-2000 Series Gages (Non-Retractable) GRM/GR-2000 Series Gages (Retractable)

Diameter Range:
50 mm – 150 mm {2.0" – 6.0"}

Non-retractable gage with ,002 mm metric or (.0001") reading indicator. Capable of measuring to within 13 mm (.500") of the bottom of a blind hole. Indicators reading in ,010 mm or ,0005" available on special order.



Part Number		Max. Gaging Depth		Overall Length		Shipping Weight	
Metric	Inches	mm	in	mm	in	kg	lbs
GAM-2031	GA-2031	75	3	203	8	2,7	6
GAM-2061	GA-2061	150	6	280	11	2,7	6
GAM-2121	GA-2121	300	12	432	17	2,7	6
GAM-2241*	GA-2241*	600	24	737	29	2,7	6

*Available 2 weeks after receipt of order.

Extension sleeves are available for converting GAM/GA-2000 Series Gages to different lengths. The following extension sleeves are available:

GA-203	Accessory Extension Sleeves 75 mm (3")
GA-206	Accessory Extension Sleeves 150 mm (6")
GA-212	Accessory Extension Sleeves 300 mm (12")
GA-224	Accessory Extension Sleeves 600 mm (24")

Retractable gage with ,002 mm metric or (.0001") reading indicator. Capable of measuring to within 13 mm (.500") of the bottom of a blind hole. Indicators reading in ,010 mm or ,0005" available on special order.



Part Number		Max. Gaging Depth		Overall Length		Shipping Weight	
Metric	Inches	mm	in	mm	in	kg	lbs
GRM-2061	GR-2061	150	6	280	11	2,7	6
GRM-2121	GR-2121	300	12	432	17	2,7	6
GRM-2241*	GR-2241*	600	24	737	29	2,7	6

*Furnished with metal case for accessories only.

Replacement Parts For 2000 Series Gages:

PBR-503A	Indicating Ball (1/8" Diameter Carbide)
G-522A	Centralizer Points (Package of 2)
G-532MA	Nut (Package of 6, metric)
G-532A	Nut (Package of 6)
G-640A	Indicating Ball Removal Tool
G-610A	#1 Point Assembly 50,8 mm-60,3 mm (2.0"-2.375")
G-611A	#2 Point Assembly 60,3 mm-69,8 mm (2.375"-2.750")
G-612A	#3 Point Assembly 69,8 mm-79,4 mm (2.750"-3.125")
G-613A	#4 Point Assembly 79,4 mm-88,9 mm (3.125"-3.500")
G-614A	#5 Point Assembly 88,9 mm-98,4 mm (3.500"-3.750")
G-615A	#6 Point Assembly 95,3 mm-107,9 mm (3.750"-4.250")
G-632A	#7 Point Extension
G-634A	#8 Point Extension
G-645A	Gage Point Assembly Ball Removal Tool
G-638A	Gage Point Assembly Wrench

Special Length Dial Bore Gages are available on a special order basis. 2000 Series Indicators cannot be peaked at lengths longer than 1650 mm (65") therefore gage accuracy is compromised. To order special length dial bore gages, specify as follows: G_-2_1X. The second _ is the desired gaging length (in inches). Available 4 weeks after receipt of order.

Dial Bore Gages

Setting Fixtures CF-1126M (metric) CF-1126 (inch)

Diameter Range:

51 mm – 203 mm {2.0" – 8.0"}



For use with 2000 Series Dial Bore Gages. Makes gage setting fast and easy. Micrometer adjustment allows "dialing in" sizes. A precision tool, shipped with convenient storage case.

Shipping Weight:
9,5 kg (21 lbs.)

Eliminates micrometers and ring gages. Eliminates errors and "feel" in setting gages. Sets 2000 Series gages in seconds.

Includes .002 mm (.0001") micrometer head with precision lapped carbide anvils. Comes with a ring gage checking standard and precision setting standards in 25,4 mm (1") increments. Setting Master has a rugged, stress-relieved, cast iron base. May be used without removing from its protective case.

Setting Fixtures are shipped complete with setting standards to cover 50 mm-152,4 mm (2"-6") range. A setting standard is not required to measure in the 178 mm-203 mm (7"-8") range. When measuring in the 152 mm-178 mm (6"-7") range order:

CF-360A 152-178 mm (metric) **CF-260A** 6"-7" (inch)

CF-1126M Replacement Setting Standards:

CF-320A* 50-75 mm **CF-340A*** 100-125 mm
CF-330A* 75-100 mm **CF-350A*** 125-150 mm
CF-360A 152-178 mm

*Included with CF-1126M

CF-1126 Replacement Setting Standards:

CF-220A* 2"-3" **CF-240A*** 4"-5"
CF-230A* 3"-4" **CF-250A*** 5"-6"
CF-260A 6"-7"

*Included with CF-1126

CF-544A Magnifier **CF-215A** Calibrating Ring
CF-137A Spanner Wrench

E Series Electronic Dial Bore Gages Features

- 16 Models + Special Lengths.
All 3000, 4000, 6000, 2000 Series
Available - Add "E" Suffix on Part Number
- Metric/Inch Conversion .001 mm or .0001" Divisions
- Display Swivels 330° for any Gaging Position
- SPC Capability
- Preset, zero set, +/- direction and Go/No Go functions.
- Communicates with Computers.

Accessories/Repair Parts

LU2X1 Connecting Cable
2 Meter Length
G799A Replacement Indicator and Bushing



Gage Point Selection Table

Use Gage Point Number	For Diameter Range	
	in	mm
1	2.000 - 2.375	50 - 60
2	2.375 - 2.750	60 - 70
3	2.750 - 3.125	70 - 79
4	3.125 - 3.500	79 - 89
5	3.500 - 3.875	89 - 98
6	3.875 - 4.250	98 - 108
7 + 2	4.250 - 4.625	108 - 117
7 + 3	4.625 - 5.000	117 - 127
7 + 4	5.000 - 5.375	127 - 137
7 + 5	5.375 - 5.750	137 - 146
7 + 6	5.750 - 6.125	146 - 156

1-G-101

Replacement Indicators for Sunnen Dial Bore Gages

Part No.	Qty.	Description
---	Ref.	Dial Indicator Assembly includes
G595A	1	Indicator (.0005 in. Reading)
G595MA	1	Indicator (0,01 mm Reading)
G795A	1	Indicator (.0001 in. Reading)
G795MA	1	Indicator (0,002 mm Reading)
G596A	1	Screw
G597A	1	Nut
G59515A	1	Bezel and Crystal Assembly - Flat Style Lens
G59513A	1	Bezel Clamp and Screw - Flat Style Lens
G595-5A	1	Bezel and Crystal Assembly - Round Style Lens
G595-3A	1	Bezel Clamp and Screw - Round Style Lens
G795-1	1	Bezel and Crystal Assembly - Flat Style Lens with Blue Bezel
G795-2	1	Bezel Clamp and Screw - Flat Style Lens with Blue Bezel



Filters

Coolant Systems/Filter Units/Filters/Filter Paper



PF Filter Cartridges

Available in two filtration grades; fine and extra fine.
Order:

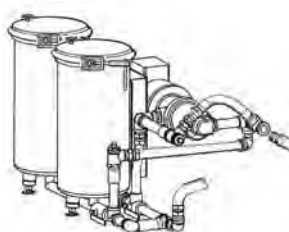
- PF-105-4** Extra Fine Filter (oil only) (Pkg. of 4)
- PF-110-4** Fine Filter (oil only) (Pkg. of 4)
- PF-104** Extra Fine Filter (oil or water) (Pkg. of 1)
- PF-160** Fine Filter (oil or water) (Pkg. of 1)

Shipping Weight: 5,4 kg (12 lbs.)

For EC/ML, CV616, CK-21, SV10, SV20, KGM machines and PF-150, PF-400, PF-401 units.

PF-401 Filter Unit Kit for STH & HT Series Tube Hone Machines

Provides additional filtration for difficult applications.



Specifications

- Flow Capacity:** 18,9 L/min @ .31 MPa
(5 gal/min @ 45 psi²)
- Sludge Capacity:** 1460 cm³ /150 inch³
- Coolant Capacity:** 26,6 L (7 gal)
- Filter Capacity:** Paper, 58,6 cm²
(9100 in²)
- Voltages Available:** 230v; 60Hz, (3 phase)
380v; 50Hz, (3 phase)

Sunnen PF-150 Grit Guard® Filtering Unit

Helps to keep honing oils and water based coolants free of metal chips and other foreign materials, thus ensuring bore quality and surface finish.

Sunnen's PF-150 oil filtering system:

- Saves you money and down time by increasing the time between coolant changes.
- Installs in 15 minutes or less.
- Automatically shuts off when filter element reaches maximum capacity.
- Filter element can easily be changed in just minutes.
- Filters available from stock.



Specifications

- Flow Capacity:** 5,7 L/min @ 1.7 bar
(1.5 gal/min @ 25 lb/in²)
- Sludge Capacity:** 1230 cm³ 75 inch³
- Coolant Capacity:** 13,3 L (3.5 gal)
- Width:** 762 mm (30")
- Depth:** 381 mm (15")
- Height:** 838 mm (33")
- Pump Motor:** 0,37 kW (1/2HP)
- Filter Capacity:** Paper, 29,3 cm² (4550 in²)
- Shipping Weight:** 90 kg (200 lbs.)
- Voltages Available:** 115v single phase, 230v; 60Hz, (single and 3 phase)
380v; 50Hz, 440V 50Hz 460v; 60Hz. (3 phase)

For HT-Holder HTW-503 needed for Sunnen supplied paperbed filters.

Filter Paper

Part Number	Micron Size	Roll Width Inches	Roll Length Yards	Core Size	Availability
F322064	10	18	100	2	2 weeks
F322073	20	39.5	150	2	2 weeks
PFC234 (for oil)	40-45	27.5	100	2	2 weeks
F322038	50	20.5	250	2	stock
F322053		32	250	2	stock
F322072		36	100	2	2 weeks
F322008			250	3	stock
F322067		39.5	150	2	2 weeks
F322071		40	250	2	2 weeks
F322020		48	250	2	stock
F322074		55	250	2	stock

NOTE: 2 inch core size is standard; 3 inch is available as special order.
Table sorted by micron size first, then roll width, then roll length.

Notes

ADAPTERS & OTHER ABRASIVES & TOOLING	
MACHINE ACCESSORIES	
GAGING	
FILTERS	
HONING FLUIDS & COOLANTS	
TECHNICAL DATA	

Honing Oils and Coolants

The single largest expense (approximately 90%) of honing cost per part is labor. The second largest expense (about 10%) is abrasive consumption. Typically, oil cost per part is less than one tenth of a percent of the total, yet, a slight decrease in cycle time, or a decrease in abrasive consumption resulting from a better lubricant, repays the cost of the honing oil many times over.

In many instances the importance of the honing oil is left out of the equation and that can be a costly mistake-because the success of the honing process depends on precision performance by each of the components of the honing system ... machine, tooling, abrasive and honing oil. Use of Genuine Sunnen Honing Oil is the solution to many honing problems.



ADAPTERS & OTHER
ABRASIVES & TOOLING

MACHINE
ACCESSORIES

GAGING

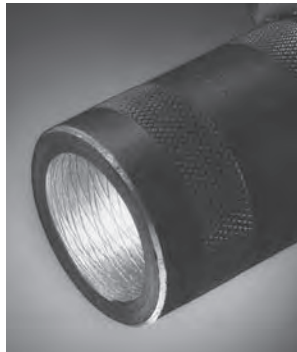
FILTERS

HONING FLUIDS
& COOLANTS

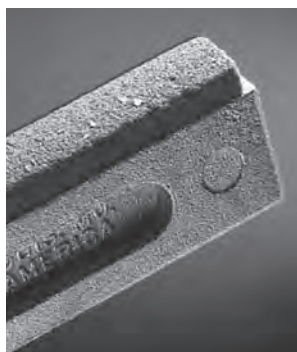
TECHNICAL DATA

Typical Honing Problems

1. Weak honing oil allows welding of metal chips to the workpiece which are then sheared off, causing a larger total surface roughness than that expected for a given abrasive grit size. The consequence is unwanted random scratches on the workpiece deeper than those normally produced during honing operations. The results are lost productivity, material waste, part rejects, and lost profits.



2. Honing oil with low lubricity or improper chemistry allows metal chips to lodge in the abrasive surface, much like mud in a snow tire. This embedded metal holds the abrasive surface away from the workpiece and slows down the cutting rate. Slower cutting rates decrease machine and operator productivity.



3. When metal embedded in the abrasive surface rewelds to the workpiece, it is torn away from the stone. This damages the stone's trailing edge because vitrified bonded abrasive, like concrete, is weak in tension. If the metal is embedded near the leading edge of the stone, it will leave a scratch in the abrasive surface.



4. Low performance honing oil can create catastrophic welding between the workpiece and the mandrel shoe when honing soft materials ranging from stainless steel to low carbon steels. This may lead to serious and very costly problems such as: ruined honing tools, machine failure, part rejects and lost profits.



Check the Sunnen Honing Oil and Coolant Selection/Information Charts on page 11.5 to properly match the right Sunnen Oil to your specific application.

Honing Oils and Coolants

MB-40 Honing Oil

SPECIFICATIONS

Chemistry:	Mineral Oil, sulfur, chlorine, phosphorus
Viscosity:	43cSt@40°C
Hazardous OSHA/DOT:	Yes/No
VOC:	194 grams/liter
Size Available:	18.91 L (5 gal) pails, 209.21 L (55 gal) drums

FEATURES & BENEFITS

- Works well with plated diamond Single Stroke Honing® Diamond tools, conventional and superabrasive honing, and KROSSGRINDING® applications
- Also useful when fine surface finishes are desired

MB-40 combines the best features of our industrial and automotive honing oils in one. It is specially formulated for use in severe applications that encounter problems such as pick up and galling.



SHO-965 Honing Oil

SPECIFICATIONS

Chemistry:	Contains no mineral oil, sulfur, or chlorine
Viscosity:	25 cSt@40°C
Hazardous OSHA/DOT:	No/No
VOC:	30 grams/liter

FEATURES & BENEFITS

- Low VOC, super-compliant in California's SCAQMD

SHO-965 is designed to provide the performance of MB-30 without the volatile organic compound content and without the odor.



MB-30 Honing Oil

SPECIFICATIONS

Chemistry:	Mineral oil, sulfur
Viscosity:	22 cSt@40°C
Hazardous OSHA/DOT:	Yes/No
VOC:	329 grams/liter
Size Available:	18.91 L (5 gal) pails, 209.21 L (55 gal) drums, 1255 L (330 gal) totes, 1L (1 Quart) bottle

FEATURES & BENEFITS

- Delivers maximum cutting rates and abrasive life when honing difficult materials like stainless steel, and features high levels of surface active lubricity agents.
- Contains metal deactivators to prevent staining of copper containing alloys
- Very effective as a general cutting oil for screw machines, drilling, tapping, and reaming
- Works on virtually any metal from aluminum to zirconium

MB-30 is Sunnen's multi-purpose industrial honing oil. For over forty years, MB-30 has set the standards by which other honing oils are judged. High performance lubricity agents combine with sulfur extreme pressure additives prevent welding and tearing of the work piece and keep the abrasive clean.



MAN-863 Honing Oil

SPECIFICATIONS

Chemistry:	Sulfur
Viscosity:	22 cSt@40°C
Hazardous OSHA/DOT:	No/No
VOC:	22 grams/liter
Size Available:	18.91 L (5 gal) pails, 209.21 L (55 gal) drums, 1255 L (330 gal) totes

FEATURES & BENEFITS

- Suitable for all materials including exotic metals
- Has a mild odor and is very gentle to operator's skin

MAN-863 was developed to answer the need for a non-hazardous, ecologically responsible, unregulated alternative to traditional honing oils. It is composed of natural surface active lubricity agents in combination with preservatives, a sulfur extreme pressure additive and metal deactivator to prevent staining of alloys containing copper.



LP8X Honing Oil

SPECIFICATIONS

Chemistry:	Mineral oil, sulfur
Viscosity:	7 cSt@40°C
Hazardous OSHA/DOT:	Yes/No
VOC:	370 grams/liter
Size Available:	18.91 L (5 gal) pails, 209.21 L (55 gal) drums, 1255 L (330 gal) totes

FEATURES & BENEFITS

- Suitable for honing a wide range of materials
- Performs well as a screw machine or general purpose cutting oil
- Compatible with the oil and filter system of all Sunnen honing machines and other manufacturers' machine tools in which petroleum oils are normally used

LP8X is a chlorine-free version of MAN-845 honing oil. LP8X is petroleum based and contains a highly effective sulfur additive in combination with lubricity agents to produce slightly higher honing performance than MAN-845 in automotive machine shop applications.



SHO-500

SPECIFICATIONS

Chemistry:	Contains no mineral oil, sulfur, or chlorine
Viscosity:	22 cSt@40°C
Hazardous OSHA/DOT:	No/No
VOC:	19 grams/liter

FEATURES & BENEFITS

- Petroleum-free, ideal for general use.
- Ideal for honing applications where additives cannot be used, such as nuclear and some aerospace parts, or where company policies discourage use of fluids with such additives.
- Does not contain material derived from animals.
- Can be used with conventional vitrified honing abrasives and metal-bond superabrasives.
- U.S. Dept. of Agriculture BioPreferred®.



Honing Oils and Coolants

MAN-852 Honing Oil

SPECIFICATIONS

Chemistry:	Contains no mineral oil, sulfur or chlorine
Viscosity:	28 cSt@40°C
Hazardous OSHA/DOT:	No/No
VOC:	1 grams/liter
Size Available:	18.91 L (5 gal) pails, 209.21 L (55 gal) drums, 1255 L (330 gal) totes



FEATURES & BENEFITS

- Approved by Boeing Aircraft Company and used to hone critical parts where classic cutting oil additives such as sulfur or chlorine have been shown to cause microcorrosion, resulting in part failure
- Has a mild odor and is very gentle to operator's skin. Very popular with operators who are sensitive to additives used in regular cutting oils

Man-852 is a non-hazardous, ecologically responsible, unregulated honing oil composed entirely of natural surface active lubricity agents. Because this product does not use additives, it is ideally suited for applications where additives are restricted, such as the aerospace and nuclear industries. MAN-852 hones most materials satisfactory, however, when used with materials such as soft copper, may produce stone loading.

KG3X Honing Oil

SPECIFICATIONS

Chemistry:	Contains no mineral oil, sulfur or chlorine
Viscosity:	21 cSt@40°C
Hazardous OSHA/DOT:	No/No
VOC:	13 grams/liter
Size Available:	18.91 L (5 gal) pails, 209.21 L (55 gal) drums



FEATURES & BENEFITS

- Typically used to hone critical parts where classic cutting oil additives such as sulfur or chlorine have been shown to cause microcorrosion, resulting in part failure
- Has a mild odor and is popular with operators who are sensitive to additives used in regular cutting oils
- U.S. Dept. of Agriculture BioPreferred®

KG3X is a non-hazardous, ecologically responsible, unregulated honing oil. Like MAN-852, it is additive free and is composed entirely of surface active lubricity agents, but is formulated to a lower viscosity. Because this product does not use additives, it is ideally suited for applications where additives are restricted, such as the aerospace and nuclear industries. KG3X hones most materials satisfactory, however, when used with materials such as soft copper, may produce stone loading.

MAN-845 Honing Oil

SPECIFICATIONS

Chemistry:	Mineral oil, sulfur, chlorine
Viscosity:	7 cSt@40°C
Hazardous OSHA/DOT:	Yes/No
VOC:	380 grams/liter
Size Available:	18.91 L (5 gal) pails, 209.21 L (55 gal) drums, 1255 L (330 gal) totes



FEATURES & BENEFITS

- Low viscosity creates less oil "carry off" and makes cleaning easier
- Also an excellent screw machine and general purpose cutting oil
- Compatible with the oil and filter system of all Sunnen honing machines and other manufacturers' machine tools in which petroleum oils are normally used

MAN-845 is formulated for general purpose automotive machine shop honing. It is excellent for con rods, piston pins, king pins, or general shop honing. MAN-845 can be boosted if necessary for occasional honing of more difficult materials (like aluminum or high nickel cast iron) by adding a small amount of Sunnen Industrial Honing Oil. It is petroleum based, containing high performance lubricity agents in combination with both sulfur and chlorine extreme pressure additives.

CK-50 Honing Oil

SPECIFICATIONS

Chemistry:	Mineral Oil, sulfur, chlorine
Viscosity:	4.4 cSt@40°C
Hazardous OSHA/DOT:	Yes/No
VOC:	428 grams/liter
Size Available:	209.21 L (55 gal) drums



FEATURES & BENEFITS

- Low viscosity creates less "carry off" of oil on the motor block and is easily cleaned in hot tanks or spray washers
- Compatible with the oil and filter system of all Sunnen Honing Machines and other manufacturers' machine tools in which petroleum oils are normally used

CK-50 is specially formulated for honing cast iron automotive and truck engine blocks and should not be used to hone other materials. It is petroleum based, containing high performance lubricity agents in combination with both sulfur and chlorine extreme pressure additives.

Honing Oils and Coolants

ADAPTERS & OTHER
ABRASIVES & TOOLING

MACHINE
ACCESSORIES

GAGING

FILTERS

HONING FLUIDS
& COOLANTS

TECHNICAL DATA

LT9X Honing Oil Concentrate

SPECIFICATIONS

Chemistry:	Contains no mineral oil, sulfur or chlorine
Viscosity:	108 cSt@40°C
Hazardous OSHA/DOT:	Yes/No
VOC:	4 grams/liter CONCENTRATE

FEATURES & BENEFITS

- Also an excellent screw machine and general purpose cutting oil
- Compatible with the oil and filter system of all Sunnen honing machines and other manufacturers' machine tools in which petroleum oils are normally used

LT9X can be used as a chlorine-free additive to boost performance or replace depleted additives in a wide variety of honing and cutting oils. (Mixing LT9X in a one-to-one ratio with mineral oil makes a formulation similar to MB-30 Honing Oil.)



MAN-C Honing Oil Concentrate

SPECIFICATIONS

Chemistry:	Mineral oil, sulfur, chlorine
Viscosity:	437 cSt@40°C
Hazardous OSHA/DOT:	Yes/No
VOC:	64 grams/liter
Size Available:	18.91 L (5 gal) pails, 209.21 L (55 gal) drums, 1255 L (330 gal) totes

FEATURES & BENEFITS

- Concentrated formula...can be mixed with mineral oil on-site to make a variety of regular-strength honing oils
- Compatible with the oil and filter system of all Sunnen honing machines and other manufacturer's machine tools in which petroleum oils are normally used
- Contains a mixture of sulphurized and chlorinated materials
- Recommended for use with hard-to-hone materials such as stainless steel, soft 8620, Inconel and Zirconium
- Useful only as concentrate to blend with mineral oil. One pail to one drum of mineral oil will result in mix similar to MAN845.

MAN-C is a honing oil concentrate, which when mixed at the proper ratios with customer supplied mineral oil, makes MAN-845 or CK-50 honing oil. The end user will save on shipping expenses by purchasing the mineral oil locally and mixing it with MAN-C at their facility.



SCC-100/101 Honing Coolant

SPECIFICATIONS

No mineral oil, sulfur or chlorine	
Viscosity:	Water
Hazardous OSHA/DOT:	No/No
VOC:	39 Grams/Liter
Size Available:	0,95 L (1 quart), 3,79 L (1 gal)

FEATURES & BENEFITS

- Foam control makes SCC-100/101 ideal for use in grinders, especially the Sunnen Valve Refacer and Tappet Refacer
- Compatible with machine tools that are designed to use water-based coolant

SCC-100/101 is a general purpose grinding fluid formulated to be very mild to the operators skin. The coolant is recommended for light duty machining and grinding of alloy steels, copper alloys and some aluminum.



SCC-205/605 Honing Coolant

SPECIFICATIONS

No mineral oil, sulfur or chlorine	
Viscosity:	Water
Hazardous OSHA/DOT:	No/No
VOC:	1 Grams/Liter
Size Available:	18.91 L (5 gal) pails, 209.21 L (55 gal) drums

FEATURES & BENEFITS

- Far superior to conventional honing oils in reducing or eliminating workpiece temperature build up
- Suitable as a grinding coolant or general purpose metal working fluid for both ferrous and non-ferrous parts
- Contains no dangerous nitrites, nitrates, PCB's, PTTBA, Mercurials, or Phenols

SCC-605 and SCC-205 Honing Coolant Concentrates are formulated to meet the demands of the KROSSGRINDING® System, Single-Stroke® Honing System and metalbond superabrasive honing.

SCC-605 and SCC-205 are very similar. Select SCC-605 when honing cast iron. This coolant has the ability to "self clean" which results in longer coolant life and consistent surface finish. Select SCC-205 when honing hardened steel using fine grit diamond plated tools or metal bond abrasives.



SCC-900 Coolant Maintenance Kit

Poor housekeeping and improper coolant concentration are the major causes of coolant failure, yet simple daily maintenance will protect and prolong coolant life.

The Sunnen SCC-900 Coolant Maintenance Kit provides everything you will need to check water based coolant. Kit includes: Instruction and Record Forms, Refractometer, PH Kit, Pitcher, Storage Case.



Honing Oils and Coolants

Selection/Information Charts

Recommended Honing Oil

		MB-40	MB-30	SHO-965	LP8X	MAN-845	CK-50	GHC351	MAN-852	MAN-863	KG3X	SHO-500	SCC-205	SCC-605
Process	Honing	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y ⁽¹⁾	Y ⁽¹⁾
	KROSSGRINDING™	Y	Y	Y	Y	—	—	Y	Y	Y	Y	Y	Y	Y
	SINGLE STROKE HONING™	Y	Y	Y	Y	—	—	Y	Y	Y	Y	Y	Y	Y
	Broaching	Y	Y	Y	—	—	—	—	Y	Y	Y	Y	—	—
	Gundrilling	Y	Y	Y	—	—	—	—	Y	Y	Y	Y	—	—
	Milling, Drilling, or Turning	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Material		MB-40	MB-30	SHO-965	LP8X	MAN-845	CK-50	GHC351	MAN-852	MAN-863	KG3X	SHO-500	SCC-205	SCC-605
Steel (hard)		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Steel (stainless), Stellite, Carbide		Y	Y	Y	—	—	—	—	Y	Y	Y	Y	Y	Y
Ceramic, Glass, Quartz, Carbon, Ferrite		Y	Y	Y	—	—	—	—	Y	Y	Y	Y	Y	Y
Nylon, Plexiglass, Polycarbonate		Y	Y	Y	—	—	—	—	Y	Y	Y	Y	Y	Y
Aluminum, Brass, bronze, Steel (soft), Cast Iron (all)		Y	Y	Y	Y	Y	—	Y	Y	Y	Y	Y	Y	Y
Specification		MB-40	MB-30	SHO-965	LP8X	MAN-845	CK-50	GHC351	MAN-852	MAN-863	KG3X	SHO-500	SCC-205	SCC-605
Chemistry	USDA Biopreferred®	—	—	—	—	—	—	—	—	Y	Y	Y	—	—
	Hazardous OSHA	Y	Y	Y	Y	Y	Y	Y	—	—	—	—	Y	Y
	Hazardous DOT	—	—	—	—	—	—	—	—	—	—	—	—	—
	Mineral Oil	Y	Y	Y	Y	Y	Y	Y	—	—	—	—	—	—
	Animal Fat	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	—	—	—
	Sulfur	Y	Y	Y	Y	Y	Y	Y	—	Y	—	—	—	—
	Chlorine	Y	—	—	—	Y	Y	—	—	—	—	—	—	—
	Phosphorus	Y	—	—	—	—	—	—	—	—	—	—	—	—
	VOC (grams/liter)	194	329	30	370	380	428	175	1	22	13	19	1	1
	Viscosity (cSt@40°C)	43	22	25	7	7	4.4	35.4	28	22	21	22	Water	Water
Size Available*	Quart/Liter 1,0 L (1/4 gal)	—	Y	Y	—	—	—	—	—	—	—	—	—	—
	Pails 18,9 L (5 gal)	Y	Y	Y	Y	Y	—	—	Y	Y	Y	Y	Y	Y
	Drums 209,2 L (55 gal)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Totes 1255 L (330 gal)	—	Y	Y	—	Y	—	Y	Y	Y	—	—	—	—

(1) Requires metalbond abrasive.

*Estimated Shipping Weight: Pails - 18,2 KG (40 lbs.) Drums - 182,0 KG (400 lbs.) Totes - 1180 KG (2600 lbs.)

Actual Weight depends on type of fluid.

www.sunnen.com

Technical Data

Stone Code Explanation Chart & Surface Finish Guide

K8	—	A	5	7	Abrasive Types	Grit Size				Hardness	
Series		Abrasive Type	Grit Size	Hardness		1-	2-	3-	4-	5-	6-
					A - Aluminum Oxide C, J - Silicon Carbide DM, DR, DV - Diamond NM, NR - CBN	70	80	100	150	220	280
						8-	9-	0-	80-	90-	100-
						400	500	600	800	900	1000
						7-	320	00-	1200		
										11-	13-
										15-	Hard

Note: For special abrasive needs, contact your Sunnen Field Engineer.

Approximate Surface Finish in Micrometers (μm) R_a

Material	Abrasive Type	Grit Size									
		80	100	150	220	280	320	400	500	600	1200
Hard Steel	Aluminum Oxide/ Silicon Carbide	0,65	-	0,50	0,45	0,30	0,25	0,12	0,08	0,03	
	CBN	-	1,40*2,00	1,15	1,00	0,70	-	0,50	-	0,18	0,05
Soft Steel	Aluminum Oxide/ Silicon Carbide	2,00	-	0,90*1,40	0,65	0,50*0,90	0,40	0,18*0,25	0,10*0,20	0,05	
	CBN	-	1,60*2,50	-	1,25*2,00	-	-	0,65	-	0,40	0,12
Cast Iron	Silicon Carbide	2,50	-	0,75*1,00	0,50	0,30	0,25	0,15	0,12	0,08	
	Diamond	-	-	-	2,00	-	-	1,27	-	0,50	0,30
Aluminum, Brass, Bronze	Silicon Carbide	4,30	-	2,00	1,40	0,85	0,70	0,40	0,30	0,05	
Carbide	Diamond	-	-	0,75	0,50	-	-	0,18	-	0,08	0,03
Ceramic	Diamond	-	-	1,27	1,00	-	-	0,50	-	0,40	0,25
Glass	Diamond	-	-	2,40	1,80	-	-	0,75	-	0,40	0,20

Surface Finish Conversions: Millimeter to Inch—To convert one unit of measure to the other use the following formulas.

Micrometer to microinch: Micrometer $\times 40$ = Microinch

Formulas for determining minimum stock removal required on diameter to achieve desired surface finish.

Surface Finish in Micrometers—(μm) R_a

$$\frac{\text{Existing Finish} - \text{Desired Finish}}{100} = \frac{\text{Required}}{\text{Stock Removal}}$$

Example: Existing Finish = 1.25 μm ; Desired Finish = 0.25 μm

$$\frac{1.25 - 0.25}{100} = 0.01 \text{ mm}$$

Approximate Surface Finish in Microinches (μin) R_a

Material	Abrasive Type	Grit Size									
		80	100	150	220	280	320	400	500	600	1200
Hard Steel	Aluminum Oxide/ Silicon Carbide	25	-	20	18	12	10	5	3	1	
	CBN	-	55*80	45	40	28	-	20	-	7	2
Soft Steel	Aluminum Oxide/ Silicon Carbide	80	-	35*55	25	20*35	16	7*10	4*8	2	
	CBN	-	65*100	-	50*80	-	-	25	-	16	5
Cast Iron	Silicon Carbide	100	-	30*40	20	12	10	6	5	3	
	Diamond	-	-	-	80	-	-	50	-	20	12
Aluminum, Brass, Bronze	Silicon Carbide	170	-	80	55	33	27	16	12	2	
Carbide	Diamond	-	-	30	20	-	-	7	-	3	1
Ceramic	Diamond	-	-	50	40	-	-	20	-	15	10
Glass	Diamond	-	-	95	70	-	-	30	-	15	8

Surface Finish Conversions: Inch to Millimeter—To convert one unit of measure to the other use the following formulas.

Microinch to micrometer: Microinch $\div 40$ = Micrometer

*If two values are shown: the first number is for small parts, honed on machines with one horsepower or less; the second number is for large parts, honed on machines with two or more horsepower.

Formulas for determining minimum stock removal required on diameter to achieve desired surface finish.

Surface Finish in Microinches—(μin) R_a

$$\frac{\text{Existing Finish} - \text{Desired Finish}}{100,000} = \frac{\text{Required}}{\text{Stock Removal}}$$

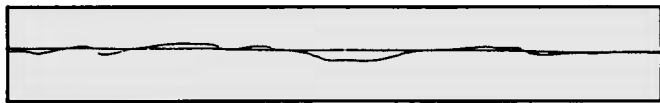
Example: Existing Finish = 50 μin ; Desired Finish = 10 μin

$$\frac{50 - 10}{100,000} = 0.0004 \text{ inch}$$

Technical Data

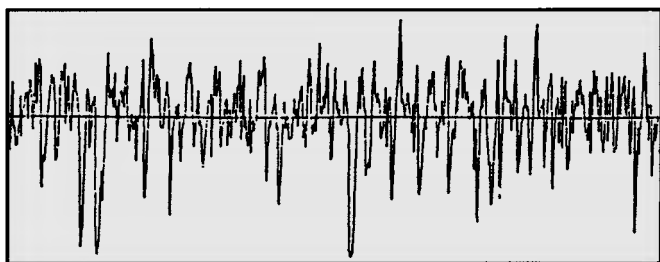
Surface Finish Information

This is what a rough honed surface looks like, magnified 400 times:



But it usually is shown like this:

The vertical magnification is now 4000 times, so it can be seen better.

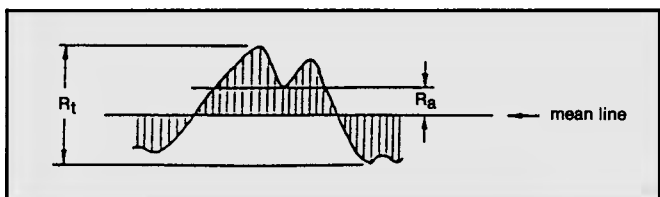


The horizontal magnification is now only 40 times, to save paper. Both graphs show the same surface finish.

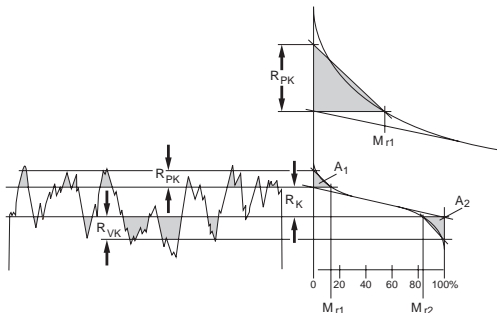
Surface Finish Parameters

Modern surface texture analyzers have the capability of measuring a variety of surface texture parameters. Every parameter has its advantages and limitations. A summary of some of the more commonly used parameters is given below.

Ra is the most widely used description of a surface. If you could level all the peaks to fill in all the valleys you would have a mean line. The arithmetic average of the deviations up and down from this theoretical mean line is Ra.



Rt is the distance from the highest peak to the deepest valley. Rt is rarely specified, but it is useful for detecting honing problems, like pick-up or areas which have not cleaned up. If Rt is much more than 10 times Ra you either have a honing problem or a plateau-honed surface.



CLA (center line average) is used in Britain and is identical to Ra.

Rz DIN, also known as **Rtm** is the same as Rt, but while Rt is established over the entire measuring length, Rz DIN divides the measured length into five equal lengths and then averages the Rt readings of each of the five lengths. Rz DIN is likely to be a slightly smaller number than Rt because one deeper scratch is diminished by the finer finish of the other four values.

Rz ISO (ten point high). The average height difference between the five highest peaks and five deepest valleys. This is the best method for short surfaces.

Rmax (same as Ry or Rma) is the distance of the highest peak to the deepest valley in any of the five sections mentioned in Rz DIN.

Rp (maximum peak height above mean line). The height of the highest peak above the mean line in five sampling distances.

Rpm (mean peak height above mean line). The average of the distances above the mean line of the five highest peaks in the total sampling distance.

RMS, Rq (root mean square). An obsolete definition; same method as Ra, but using a different mathematical principle. Results in a value about 15% higher than Ra.

Rk The main bearing area of a surface, ignoring the highest peaks and deepest valleys. The magnitude of these peaks and valleys can be defined as Rpk and Rvk respectively.

Parameter Conversion Formula*

For a one grit size developed surface finish to convert a known Ra value to a different parameter, use the following formula (These ratios do not apply to composite grit surface finishes - such as "plateau" or surface finishes from other machining processes):

$Ra \times \text{Parameter Factor} = \text{Desired Parameter}$

Ex: 1.0 micrometer Ra \times 8.7 (Rt Factor) = 8.7 micrometer Rt

Ex: 40 microinch Ra \times 8.7 (Rt Factor) = 348 microinch Rt

*These conversions are approximate values for general information only and apply only when checking a standard honed finish.

Parameter	Factor
Rt	8.7
Rz	7.2
Rz ISO	7.6
Rmax	8.0
Rp	3.6
RPM	2.9
RMS	1.1

Symbol	Definition
R_k	Core roughness depth
R_{pk}	Reduced peak height
R_{vk}	Reduced valley depth
M_{r1}	Peak material ratio
M_{r2}	Valley material ratio

Technical Data

Alteration of Honing Units

ADAPTERS & OTHER
ABRASIVES & TOOLING

MACHINE
ACCESSORIES

GAGING

FILTERS

HONING FLUIDS
& COOLANTS

TECHNICAL DATA

Sunnen honing units have been designed to handle most honing jobs without alteration. However, as tolerances on the job become closer, it becomes more essential that tooling comes closer to meeting the ideal requirement of the bore. Alteration of the stone and guide shoe may be necessary to provide a honing unit for the particular job. One or more of three basic types of alteration to honing units may be required on some applications: (1) for short open holes, (2) for blind holes, or (3) for alignment of tandem bores. All of these alterations can be made quite easily and very quickly in your own shop. For long production runs or repeat jobs it may be advantageous to order altered stones or mandrels from the factory.

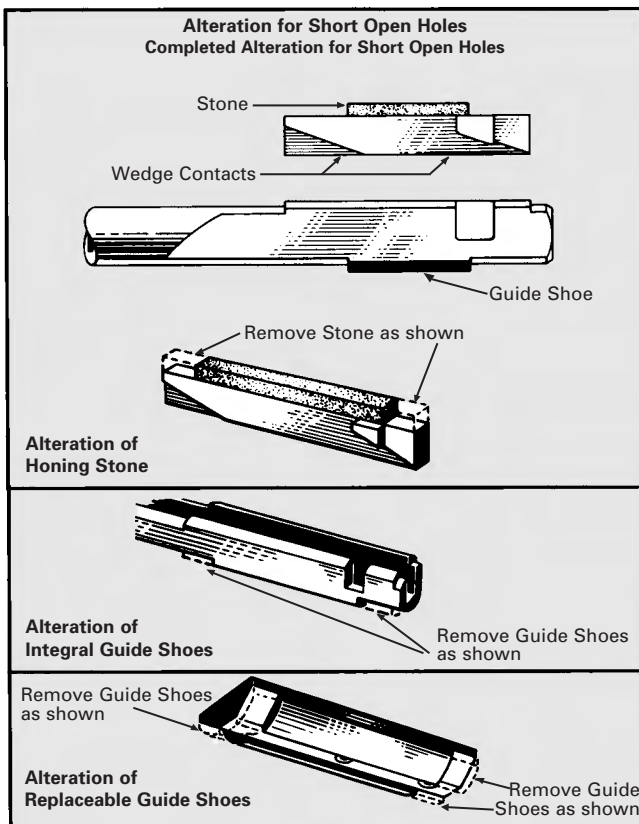
How to Alter Stone, Mandrel, and Guide Shoes

When alteration of the honing tool is necessary use the following procedure:

Conventional Abrasives—Aluminum Oxide (A) and Silicon Carbide (J and C), cut through the abrasive with an old hacksaw blade and break off the unwanted section with a pair of pliers. Avoid breathing dust. Wash dust from hands to prevent skin irritation.

Superabrasives—Diamond (D) and CBN (N). Remove the unwanted section by grinding on a bench grinder. Avoid breathing any mist or dust. Wash dust from hands to prevent skin irritation.

Do not alter the metal stoneholder (except as described under blind hole alterations). Use a file or bench grinder to shorten the mandrel guide shoes. Avoid breathing any metal dust. Wash dust from hands to prevent skin irritation.

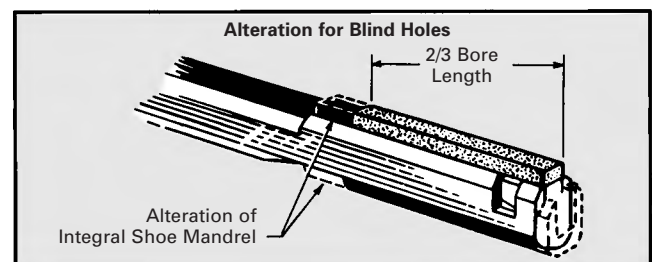


Alterations for Short Open Holes—Always consider the possibility of stacking parts with short bores so that they may be honed as one long bore using standard honing units. Individual parts (if they have at least one flat face) with bore lengths of 1/4 the diameter, or less, can also be honed by holding the parts flat against the face plate of the KKN-100 Honing Fixture (see page 8.1). For precision sizing of short open holes, THE STONE AND GUIDE SHOE LENGTH SHOULD BE BETWEEN 2/3 AND 1-1/2 TIMES THE BORE LENGTH to be honed. When alteration is necessary, both the stone and guide shoes must be shortened by the same amount. Any alteration of this type should shorten the stone and shoes equally from both ends so that the honing area remaining is centered over the wedge contacts on the stoneholder.

If greater accuracy is required than is obtained after the alteration, refer to the "Honing Guide" in your Honing Machine Operating Instruction Manual. Additional information can also be obtained by contacting the Customer Service Dept. and requesting a copy of Data File 102, "Honing Short Bores."

Alterations for Blind Holes—If at all possible, provide a relief (undercut) at the closed end of the hole to permit the stone to overstroke the honed surface. The relief can be cut to a depth that will actually blend in with the bore when finish honed, but it should be as long as possible, preferably 1/3 the length of the stone.

Sunnen honing units in the K, J-K, AK, J-AK, BL, L, BAL, AL and P28 groups can be utilized for honing bores that have one end closed. In honing blind holes, it is necessary for the stone and guide shoes to extend flush with the tip of the honing unit. If your application utilizes one of the P28 group of honing units, install the blind hole wedge and R28 Honing Stones and move end guide shoe flush with end of mandrel (see page 2.51). The remaining mandrel groups have a tip which extends slightly beyond the front end of the stone and guide shoes. For blind hole work this tip must be cut off, as illustrated. Mandrels which have been altered in this manner can still be used for honing open holes using a full length stone and guide shoes. P20 and D Honing Unit groups are not adaptable for honing blind holes. Blind Hole Y mandrels are available on a special order basis.



In honing blind holes, the STONE AND GUIDE SHOE LENGTH SHOULD BE BETWEEN 1/2 AND 2/3 THE BLIND HOLE LENGTH. This is necessary to provide for proper stroking. When alteration of the stone and shoe length is necessary, remove material only from the back end as shown.

Technical Data

Alteration of Honing Units

ADAPTERS & OTHER
ABRASIVES & TOOLING

MACHINE
ACCESSORIES

GAGING

FILTERS

HONING FLUIDS
& COOLANTS

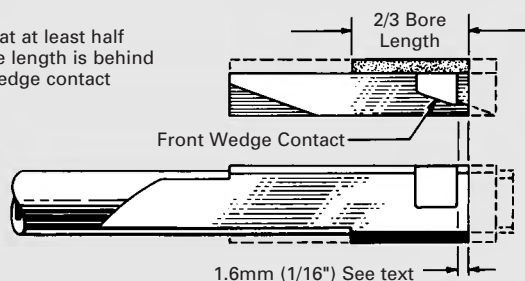
TECHNICAL DATA

To maintain stability of the stone in the mandrel, it is important that at least 50% of the stone be behind the forward wedge contact on the stoneholder. Otherwise the stone could rock, causing bore inaccuracies as the work is stroked over the honing unit. To avoid any chance for the stoneholder to "rock" when honing extremely shallow or short blind holes, it may be necessary to cut back the metal stoneholder (as well as the abrasive), mandrel, shoes and wedge tip so that only 1,6 mm (1/16") extends beyond the front wedge contact. Pressure from the wedge is then applied evenly to the stoneholder.

Some improvement can be obtained in honing blind holes where no relief is possible at the blind end by using a "HARD-TIP" stone. The front section of the abrasive has a harder bond than the rest of the stone. This harder abrasive reduces the excessive wear that the stone tip is exposed to when no relief is present. Refer to the Available Stone Sections of this catalog for information on hard-tip stones. Additional information can also be obtained by contacting the Customer Service Dept. and requesting a copy of Data File 103, "How to Hone Blind Holes."

Alteration for Extremely Short Blind Holes

Note that at least half of stone length is behind front wedge contact



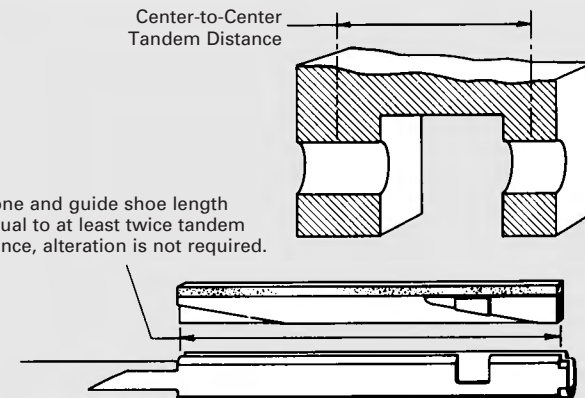
Alterations for Tandem Holes—Sunnen honing units can be used to size two or more "in-line" or tandem bores in perfect alignment. Stone and guide shoes must be of the proper length so that the entire stone surface will contact one or the other of the bores at some time during the honing stroke. To keep the honing unit true during the operation, the STONES AND GUIDE SHOE LENGTH MUST BE AT LEAST TWICE THE CENTER-TO-CENTER TANDEM DISTANCE OF THE BORES (see illustration). When the honing unit meets this requirement, alteration is not required.

Be sure to reverse the part end for end on the honing unit so that identical bore sizes are obtained. Never stroke either of the tandem bores completely off the stone and guide shoes. Should the stone and guide shoe length be less than twice the tandem distance, the center area of the stone and guide shoes will not wear and a resulting "hump" in the honing unit will bellmouth the inside ends of both bores of the tandem.

Tooling for Tandem Bores

Center-to-Center
Tandem Distance

If stone and guide shoe length is equal to at least twice tandem distance, alteration is not required.

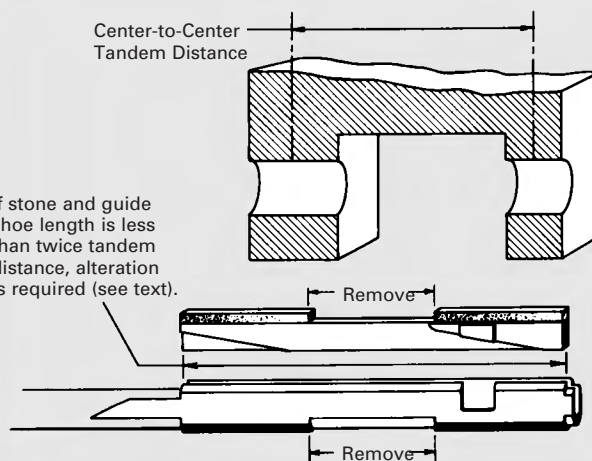


In some tandem applications, it is necessary to alter the honing unit by cutting away the area of stone and guide shoes that would become the "hump." Remove from the center of both the stone and guide shoes an amount equal to the amount they are short of being twice the tandem distance. For example, a part having a 69,9 mm (2 3/4") tandem spacing would require a 139,7 mm (5 1/2") stone and guide shoes, but the honing unit has a stone and guide length of only 114,3 mm (4 1/2"). This honing unit can be used by removing 25,4 mm (1") from the center of the 114,3 mm (4 1/2") stone and guide shoe length. Multiple stone honing units (P20 and P28) can sometimes be used by setting up the honing unit to leave out the center stones and shoes.

Alteration for Tandem Bores

Center-to-Center
Tandem Distance

If stone and guide shoe length is less than twice tandem distance, alteration is required (see text).



Additional information can also be obtained by contacting the Customer Service Dept. and requesting a copy of Data File 106, "Honing Tandem Bores."

Technical Data

Guide Shoes • Truing Sleeves • Wedges • Runout Correction • Shims

Guide Shoes-Integral Shoe Mandrels—Mandrels up to 19,0 mm (.750") diameter are solid steel with integral guide shoes — except Keyway (Y) Mandrels, which are solid steel with integral guide shoes up to 25,4 mm (1") diameter. Soft shoe mandrels are recommended for all general honing operations. For honing carbide, ceramic, glass, for extremely rough holes and for some long production jobs, mandrels with hardened steel shoes are recommended.

Where extremely fine finishes are required and 600 or 1200 grit stone is used, solid bronze mandrels with integral shoes are recommended. Occasionally, unusual specifications do not permit the use of sulfur-based honing oil and it may be necessary to use bronze mandrels to reduce the possibility of galling.

Also use a bronze mandrel when a material is very soft or subject to galling.

Production jobs in materials which are prone to galling are best honed by using a bronze guide shoe in which a metal bonded diamond or Borazon stone/stones have been inserted into a bronze guide shoe.

Guide Shoes-Replaceable Shoe Mandrels—The guide shoes supplied as standard with replaceable shoe mandrels have been found to be best for most honing applications. There are cases, however, where "other than standard" guide shoes are more suitable.

When the work being honed is unusually rough or out of round, or has burrs or wire edges, hardened steel guide shoes are usually more economical. The hardened shoes are also more economical when CBN or diamond honing stones are being used.

Important: Guide shoes of different materials should never be mixed on a multi-stone length mandrel. When shoes are removed from a mandrel to be used later, they should be reassembled in their original position.

Proper Use of Truing Sleeves—It is essential that honing tools be kept accurate and true, the same as any other precision tool. The stone and guide shoes must remain parallel to each other and parallel with the axis of the mandrel. It is also important that the stone and guide shoe be radiused to the approximate diameter of the work to be honed. This is especially true when the job being honed requires good surface finish or high accuracy, and for smooth operation in bores containing keyways.

To true a conventional abrasive stone (A or J) and mandrel most quickly, use a truing sleeve. Saturate the stone with honing oil. Hone the sleeve manually as you would during a normal honing operation, but WITHOUT A FLOW OF HONING OIL. Reverse the truing sleeve frequently.

To true superabrasive stones (D or N) true as you would a conventional abrasive stone however, apply a small amount of abrasive grit to the stone and guide shoe before honing. (Using the abrasive slurry found in the work tray is acceptable.)

Because a honing unit must be trued closer to the diameter of the work, excessively worn truing sleeves should be discarded.

Wedges—Wedges are subject to wear, and to assure optimum accuracy they should be replaced when they begin to show wear.

Wedges supplied with all permanent type mandrels (replaceable guide shoes) have long life but should be inspected regularly and replaced if showing any wear. This is especially important in the AK20, BAL20, AL20, and Y32 honing unit groups.

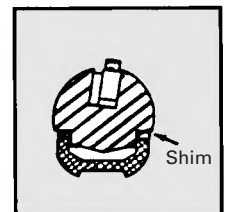
Wedge Plates—High and low wedge plates are supplied with Keyway (Y) Mandrels of 34,7 mm (1.365") size and larger, to provide complete coverage of the mandrel diameter range even when guide shoes and stones are worn. Use the low wedge plate (e.g., Y56L-W) unless the stone cannot be expanded far enough to reach the diameter to be honed (within the range of the honing unit). Use the high wedge plate (e.g., Y56H-W) when necessary to reach the diameter to be honed.

Inserting Mandrel—Do not overtighten set screw in spindle nose or adapter.

Honing Unit Runout Correction—In some cases, due to the weight or shape of the workpiece, the spindle speed, or the requirement of high accuracy, it is desirable to reduce or eliminate eccentric runout of the honing unit.

Since 1950, Sunnen Honing Machines have had an adjustable spindle chuck for runout compensation. Older type machines use an eccentric spindle sleeve — when runout seems excessive, rotate the sleeve one-half turn. In addition, on P28 type honing units, mandrel shims can be inserted under the guide shoes to help reduce runout (see MANDREL SHIMS below).

Mandrel Shims—are furnished with all P28 honing units. They are inserted between the mandrel body and guide shoes when necessary to reach the maximum diameter, especially when the guide shoes are worn. They can also be used to help compensate for mandrel runout.



Technical Data

Honing Performance Information

ADAPTERS & OTHER
ABRASIVES & TOOLING

MACHINE
ACCESSORIES

GAGING

FILTERS

HONING FLUIDS
& COOLANTS

TECHNICAL DATA

"How long should it take to hone my part?"

... is one of the most important questions asked by honing machine operators when starting a job. Many operators do not have the luxury of having the number of parts needed to determine the best set up or would like to know if they should be doing better. A good method of estimating cycle time is also necessary when bidding on "new" honing jobs.

Several methods have been developed to assist Sunnen Honing Machine operators in estimating honing times when parts are honed by one of the three following Sunnen systems:

- 1) ML/EC Series Power Stroked Machines
- 2) "Hand-Powered" Portable Hones
- 3) Horizontal Tube Hone with H70 Stone Sets

ML/EC Series Power Stroked Machines

This method of estimating cycle times is most accurate when honing low-alloy steel (hard or soft) using a 220 grit CBN/Borazon stone with Sunnen Industrial Honing Oil.

Honing Time Equation: Finish diameter x part length x stock removal x honing time factor = seconds required to hone.

Workpiece Diameter mm	Honing Time Factor	Workpiece Diameter in	Honing Time Factor
1,5	2.94	0.0625	50000
3,0	1.22	0.125	20000
5,0	0.805	0.1875	12500
6,0	0.590	0.250	8350
7,0	0.50	0.375	5000
8,0	0.415	0.4375	4150
10,0	0.325	0.500	3700
12,0	0.25	0.625	2750
15,0	0.19	0.750	2375
18,0	0.155	0.875	1875
20,0	0.14	1.000	1725
25,0	0.105	1.125	1475
30,0	0.09	1.250	1375
35,0	0.075	1.375	1250
40,0	0.065	1.500	1100
50,0	0.05	1.750	975
60,0	0.045	2.000	820
		2.250	725
		2.500	615

Example: 1" Diameter, 2" Length, .005" Stock Removal: $1 \times 2 \times .005 \times 1725 = 18$ seconds, assuming low-alloy steel, soft or hard, honed with Superabrasive roughing stone, such as K20-NM55 with MAN-863 Honing Oil.

Cycle times will be 2-5 times longer with 1800 series machines.

"Hand-Powered" Portable Hones

This method of estimating honing times is based on using G25, M27, N37, W47, or similar Sunnen stone with Sunnen Industrial Honing Oil.*

Honing Time Equation:

Millimeters:

Length x Diameter x Required Stock Removal
 $\times 0.00076 =$ Honing Time in Minutes.

Example: $1220 \text{ mm} \times 101,6 \text{ mm} \times .254 \text{ mm}$
 $\times 0.00076 = 24$ Minutes Honing Time.

Inches:

Length x Diameter x Required Stock Removal
 $\times 12.5 =$ Honing Time in Minutes.

Example: $48" \times 4" \times .010" \times 12.5 = 24$ Minutes Honing Time.

**This equation should not be used to estimate "floor-to-floor" time if the operator manually strokes the hone as it does not include rest breaks or stops required to feed up stones. It is most accurate in estimating "floor-to-floor" times when using a remote feed honing unit and a power drive source.*

HTB Horizontal Tube Honing with H70 Stone Sets

This method of estimating cycle time is most accurate when considering soft low-alloy steel using a roughing aluminum oxide stone (H70-A45) with Sunnen Industrial Honing Oil.

Honing Time Equation:

Millimeters:

Length x Diameter x Required Stock Removal
 $\times 0.0003 =$ Honing Time in Minutes.

Example: $1200 \text{ mm} \times 100 \text{ mm} \times 0,28 \text{ mm}$
 $\times 0.0003 = 10$ Minutes Honing Time.

Inches:

Length x Diameter x Required Stock Removal
 $\times 5 =$ Honing Time in Minutes.

Example: $48" \times 4" \times .010" \times 5 = 10$ Minutes Honing Time.

H70 Stone Life

Another important factor essential for efficient honing is being able to estimate the number of workpieces that can be produced with a set of stones. This number is important when figuring the cost of honing a part and from the point of insuring that enough stones are available to complete the job. This formula is based on honing workpieces using H70 roughing Aluminum Oxide stone sets (H70-A45).

Millimeters:

$(\text{Final Diameter}^2 - \text{Starting Diameter}^2) \times \text{Length} \times 0,0000018 =$ Sets of Stones

Example: $(101,6 \text{ mm}^2 - 101,3 \text{ mm}^2) \times 1220,0 \text{ mm} \times 0,0000018 = ,11$ Sets of Stones
 $1,0 \text{ set of stone} \div ,11 = 9$ Parts Per Stone Set

Inch:

$(\text{Final Diameter}^2 - \text{Starting Diameter}^2) \times \text{Length} \times .03 =$ Sets of Stones

Example: $(4,0^2 - 3,990^2) \times 48" \times .03 = ,11$ Sets of Stones
 $1,0 \text{ set of stone} \div ,11 = 9$ Parts Per Stone Set

Technical Data

Glossary of Terms

ADAPTERS & OTHER
ABRASIVES & TOOLING

MACHINE
ACCESSORIES

GAGING

FILTERS

HONING FLUIDS
& COOLANTS

TECHNICAL DATA

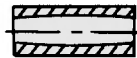
Adapter - A part used with certain mandrels to adapt them to fit the spindle chuck on the honing machine.

Alignment Bushing - A concentric bushing used to minimize conical and parallel runout on machines with fully adjustable spindle noses.

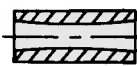
Altered Stone - A standard honing stone, which has been shortened or otherwise changed for a specific application.

Aluminum Oxide - A man-made abrasive most often used in honing soft and medium hard steel. Designated by the letter "A" in the Sunnen stone code. Example: K12-A57.

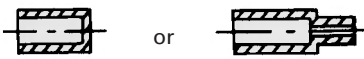
Barrel Shape - A condition where the extreme ends of a bore are smaller in diameter than the middle.



Bellmouth - A condition where the extreme end or ends of a bore are larger in diameter than the middle.



Blind Hole - A bore that is constricted or closed at one end.



Bond - The material that holds the abrasive grains together in a honing stone. Conventional Abrasives use fused clay or glass and are known as Vitrified bonded stones. Superabrasive stones use a metal bond, resinoid bond, or a vitrified bond.

CBN - A man-made abrasive (cubic boron nitride) especially useful for honing the tough alloy steels and other abrasive resistant materials. Designated by the letter "N" in the Sunnen stone code. Example: P28-NM55.

Cork Bond - A bonding material composed of powdered cork and phenolic resin. Cork bonded honing stones are used where extremely fine surface finish is required. (Best results are achieved when used with bronze guide shoes.)

Deburring - A honing process used to remove burrs, sharp edges or similar materials from rough bores.

Diamond - A very hard abrasive grain, which is essential to the honing of carbide, glass and ceramic materials. Designated by the letter "D" in the Sunnen stone code. Example: K8-DV57

Diamond Dresser - A diamond abrasive used to dress honing stones other than Borazon or diamond.

Fixturing - a method used to hold the workpiece while honing. Suggestions on different fixturing methods can be found in Data Files #107, 108, and 109.

Glazed Stone - A stone with cutting action impaired because the abrasive particles failed to break out of the bond when the cutting edges wore off. This condition shows up when the bond is too hard.

Guide Shoes - A part of the honing unit that stabilizes the bore being honed on the tool.

Hardness - As applied to a honing stone, describes the strength of the bond that holds the abrasive grains longer; a soft bond will permit the stone to "break down" faster, exposing new sharp abrasive grains. **Hard-Tip Stone** - A honing stone having a tip or end of harder abrasive than the body of the stone. Used for honing blind holes where relief cannot be provided.

Hard-Tip Stones - Used primarily for blind hole applications, the tip of the stone is engineered to be more wear-resistant than rest of the stone.

Honing - An abrasive machining process primarily used for stock removal, precision sizing, and surfaces. It is characterized by the use of a self-sharpening abrasive stone, a relatively large area of contact with the work, and relatively low cutting speeds.

Honing Length - The actual length of the surface being honed.

Honing Stone - An abrasive stick consisting of thousands of small abrasive grains bonded together.

Honing Unit - A complete honing tool consisting of an adapter (if required), a mandrel and wedge, stone(s), guide shoes, truing sleeve, and stone retainer or tension block.

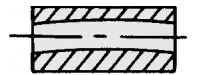
Loaded Stone - A honing stone with cutting action impaired due to the cutting surface being partially covered with a foreign material, usually the material being honed. This condition is sometimes encountered when honing soft materials.

Mandrel - That part of a honing unit which holds and positions the honing stone and guide shoes in their correct relative positions.

Metal Bond - A powdered metal bond often used with diamond or Borazon abrasives. Designated by the letter "M" in the Sunnen stone code. Example: P28-NM55.

Overstroke - The distance that the workpiece is stroked beyond the end of the stone. This distance is generally one-third the length of the stone (or of the part, whichever is the shortest).

Rainbow (or bow) - Sometimes called camber or banana shape. A condition where a bore's diameter may be the same over its full length but whose axis or center-line is curved. Correction of rainbow by honing requires a mandrel in which the stone and guide shoe length is at least 1-1/2 times the length of the bore.



Relief - An enlargement of diameter at the bottom of a blind hole which makes it possible for the end of the honing stone to pass beyond the bottom end of the surface being honed.

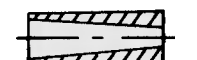
Runout - Off-center rotation of the honing unit which causes eccentric motion of the workpiece.

Silicon Carbide - A man-made abrasive most often used for stock removal in materials such as cast iron, brass, bronze or aluminum. Also used for fine finishes in all materials. Designated by the letter "J" in the Sunnen stone code. Example: K12-J47.

Stacking - A technique for honing short parts. Faces of the parts must be square with the bore prior to honing. A holding fixture is necessary for aligning and holding the parts on a common center.



Taper - A bore condition where the diameter of a bore gradually increases from one end of the bore to the other.



Truing Sleeve - A cylinder or workpiece whose purpose is to make the guide shoes and stone straight and parallel to each other, and radiused to the approximate diameter to be honed.

Waviness - A longitudinal wave, series of waves or ripple in a bore surface.



Wedge - The part of the honing unit that expands the honing stone and applies cutting pressure.

Hardness Conversion Table

ADAPTERS & OTHER ABRASIVES & TOOLING	Brinell Hardness	Rockwell Hardness Number						Rockwell Superficial Hardness Number						Tensile Strength
		A Scale	B Scale	C Scale	D Scale	E Scale	F Scale	15-N Scale	30-N Scale	45-N Scale	15-T Scale	30-T Scale	45-T Scale	
MACHINE ACCESSORIES	10-mm Std. Ball 3000-kgf load	Diamond Penetrator 60-kgf load	1.588-mm 1/16" Ball 100-kgf load	Diamond Penetrator 150-kgf load	Diamond Penetrator 100-kgf load	3.175-mm 1/8" Ball 100-kgf load	1.588-mm 1/16" Ball 60-kgf load	Superficial Diamond Penetrator 30-kgf load	Superficial Diamond Penetrator 30-kgf load	Superficial Diamond Penetrator 45-kgf load	1.588-mm 1/16" Ball 15-kgf load	1.588-mm 1/16" Ball 30-kgf load	1.588-mm 1/16" Ball 45-kgf load	KSI
	750	85.0	—	66.0	76.0	—	—	93.0	83.0	73.0	—	—	—	—
	710	84.0	—	64.0	74.0	—	—	92.0	81.0	71.0	—	—	—	—
	682	83.0	—	62.0	73.0	—	—	91.0	79.0	69.0	—	—	—	—
	653	81.0	—	60.0	71.0	—	—	90.0	78.0	67.0	—	—	—	314
	578	80.0	—	58.0	69.0	—	—	89.0	76.0	64.0	—	—	—	299
	555	79.0	—	56.0	68.0	—	—	88.0	74.0	62.0	—	—	—	284
	534	78.0	—	54.0	66.0	—	—	87.0	72.0	60.0	—	—	—	270
	495	77.0	—	52.0	65.0	—	—	86.0	70.0	57.0	—	—	—	256
	479	75.5	—	50.0	63.0	—	—	85.5	68.0	54.5	—	—	—	244
	450	74.5	—	48.0	61.5	—	—	84.5	66.5	52.5	—	—	—	228
	425	73.5	—	46.0	60.0	—	—	83.5	64.5	50.0	—	—	—	212
	403	72.5	—	44.0	58.5	—	—	82.5	63.0	47.5	—	—	—	201
	382	71.5	—	42.0	57.0	—	—	81.5	61.0	45.5	—	—	—	189
	363	70.5	—	40.0	55.5	—	—	80.5	59.5	43.0	—	—	—	178
	346	69.5	—	38.0	54.0	—	—	79.5	58.0	41.0	—	—	—	167
	329	68.5	—	36.0	52.5	—	—	78.5	56.0	38.5	—	—	—	160
	313	67.5	—	34.0	50.5	—	—	77.5	54.5	36.0	—	—	—	153
	298	66.5	106	32.0	49.5	—	116.5	76.5	52.5	34.0	94.5	85.5	77.0	144
	275	64.5	104	28.5	46.5	—	115.5	75.0	49.5	30.0	94.0	84.5	75.0	130
	258	63.0	102	25.5	44.5	—	114.5	73.5	47.0	26.5	93.0	83.0	73.0	121
	241	61.5	100	22.5	42.0	—	113.0	72.0	44.5	23.0	92.5	81.5	71.0	114
	228	60.5	98	20.0	40.0	—	112.0	70.5	42.0	20.0	92.0	80.5	69.0	107
	215	59.0	96	17.0	38.0	—	111.0	69.0	39.5	17.0	91.0	79.0	67.0	101
	204	57.5	94	14.5	36.0	—	110.0	68.0	37.5	14.0	90.5	77.5	65.0	98
	194	56.5	92	12.0	34.0	—	108.5	66.5	35.5	11.0	89.5	76.0	63.0	93
	184	55.0	90	9.0	32.0	108.5	107.5	65.0	32.5	7.5	89.0	75.0	61.0	89
	176	53.5	88	6.5	30.0	107.0	106.5	64.0	30.5	5.0	88.0	73.5	59.5	85
	168	52.5	86	4.0	28.0	106.0	105.0	62.5	28.5	2.0	87.5	72.0	57.5	87
	161	51.5	84	2.0	26.5	104.5	104.0	61.5	26.5	-.5	87.0	70.5	55.5	78
	155	50.0	82	—	24.5	103.0	103.0	—	—	—	86.0	69.5	53.5	75
	149	49.0	80	—	22.5	102.0	101.5	—	—	—	85.5	68.0	51.5	72
	144	47.5	78	—	21.0	100.5	100.5	—	—	—	84.5	66.5	49.5	69
	139	46.5	76	—	19.0	99.5	99.5	—	—	—	84.0	65.5	47.5	67
	134	45.5	74	—	17.5	98.0	98.5	—	—	—	83.0	64.0	45.5	65
	129	44.0	72	—	16.0	97.0	97.0	—	—	—	82.5	62.5	43.5	63
	125	43.0	70	—	14.5	95.5	96.0	—	—	—	82.0	61.0	41.5	61
	121	42.0	68	—	13.0	94.5	95.0	—	—	—	81.0	60.0	39.5	59
	118	41.0	66	—	11.5	93.0	93.5	—	—	—	80.5	58.5	37.5	57
	114	40.0	64	—	10.0	91.5	92.5	—	—	—	79.5	57.0	35.5	55
	111	39.0	62	—	8.0	90.5	91.5	—	—	—	79.0	56.0	33.5	53
	108	—	60	—	—	89.0	90.0	—	—	—	78.5	54.5	31.5	51
	108	—	58	—	—	88.0	89.0	—	—	—	77.5	53.0	29.5	—
	103	—	56	—	—	86.5	88.0	—	—	—	77.0	51.5	27.5	—
	100	—	54	—	—	85.5	87.0	—	—	—	76.0	50.5	25.5	—
	98	—	52	—	—	84.0	85.5	—	—	—	75.5	49.0	23.5	—
	95	—	50	—	—	83.0	84.5	—	—	—	74.5	47.5	21.5	—
	93	—	48	—	—	81.5	83.5	—	—	—	74.0	46.5	19.5	—
	91	—	46	—	—	80.5	82.0	—	—	—	73.5	45.0	17.0	—



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