

Experience Performance Quality

HUNGER - a company with experience - specializing in the manufacture of precision tools and valve service equipment for many years - and with the most comprehensive range of valve service equipment.

Years ago, **HUNGER** pioneered precision valve and valve seat refacing systems which have been further developed and refined until we have the present high performance equipment.

The qualities of **HUNGER** equipment are derived from working in very close cooperation with leading engine manufacturers and the research and experience gained by **HUNGER** in over 60 years of precision equipment manufacture.

HUNGER equipment has been tested and approved by leading engine manufacturers and is being used for high performance work throughout the world. Today's exacting tolerances and finishes call for **HUNGER** equipment.

You can rely on **HUNGER**.

HUNGER manufactures also a comprehensive range of valve and valve seat refacing machines for servicing the valves and valve seats of large marine and stationary diesel engines.

Please feel free to ask for further information



	Page
Hunger Valve Seat Refacing	4
Valve Seat Refacing Tools:	
Type VDS1A for Seats from 14 to 60 mm diam.	5 - 18
Parts - Accessories	6 - 7
Sets	8
Pilots Series VD1	9 - 10
Cutters	11 - 18
Type VDS2 for Seats from 30 to 90 mm diam.	19 - 21
Parts - Accessories - Sets	18
Pilots Series VD2	20
Cutters	21 - 22
Type VD2 for Seats from 30 to 90 mm diam.	23 - 25
Parts - Accessories - Sets	24 - 25
Steady	26
Counterboring Tool:	
Type RDS1	29 - 32
Parts - Accessories	30 - 31
Cutters for RDS1	32
Seating Refacing Tool	
BDW Refacing Tool for the cylinder liner seating	33
Cylinder Head Stand	
K2000 Cylinder Head Stand	34 - 35
Valve Refacing Machines	
VKS 16 Valve Grinding Machine	36 - 37
VKM 1A Valve Grinding Machine	38 - 39
Valve Guide Tool Kit	40 - 41
Checking Equipment	42
Valve Guide Reamers	
Expanding Valve Guide Reamers Type V	43 - 44
Solid Valve Guide Reamers Type VR	45
Expanding Reamers for Workshops	
Expanding Reamers Type D	46
Expanding Reamers Type E	47
Expanding Reamers Type Typ K	48
Expanding Reamers Type Typ U	49-50
Expanding Shell Reamers Type Type H	51
Tool Bars and Tool Bar Guides	52
Align Reaming and Boring	53
Supporting Fixture for Tool Bars	54
Boring Heads - Feed Devices	55

The Hunger Valve Seat Refacing Method, the superior alternative to grinding and form cutting.

Working Principle:

The Hunger VD refaces the valve seat in a lathe-type facing action.

The valve seat is refaced to the preset depth by the simultaneous application of both a rotary and a transverse feed motion to the single point carbide cutter.

While the single point carbide cutter rotates in a circle around the valve seat, a feed gear mechanism ensures a continuous outward transverse feed motion under the proper seat angle.

This angle is defined by an inclined slide-way in the exchangeable adapter head.

Hunger machining eliminates the high and low spots normal to surface grinding or form cutting.

Handling:

Operation is straightforward.

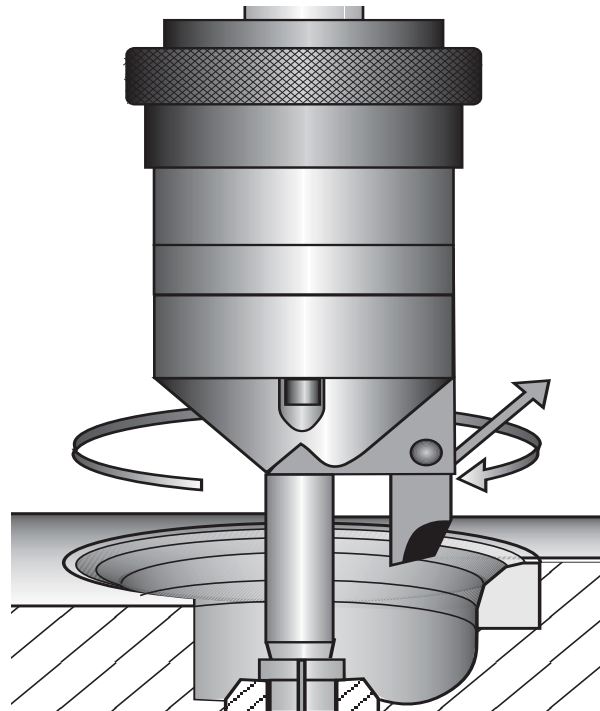
No setting gauges, no time consuming measurements or guesswork when mounting the cutter and setting up the VD on pilot.

First, lock the pilot in the valve guide.

Then lower VD over the pilot and position the cutter in front of the inner edge of the valve seat.

Turn micrometer infeed to set the desired depth of cut.

Rotate VD with handle to reface the valve seat in a lathe-type refacing action.



Advantages:

The Hunger VD refaces the valve seat in flawless concentric patterns, providing the best surface texture for a complete valve seal.

The Hunger VD refaces all types of seats within a very broad diameter range. Carbide tipped cutters or cutters with indexable carbide insert handle seat materials from cast iron to stellite.

Cutters are available for both seat refacing and seat narrowing by machining an outer and/ or inner correction with the primary and/or secondary cutting edge.

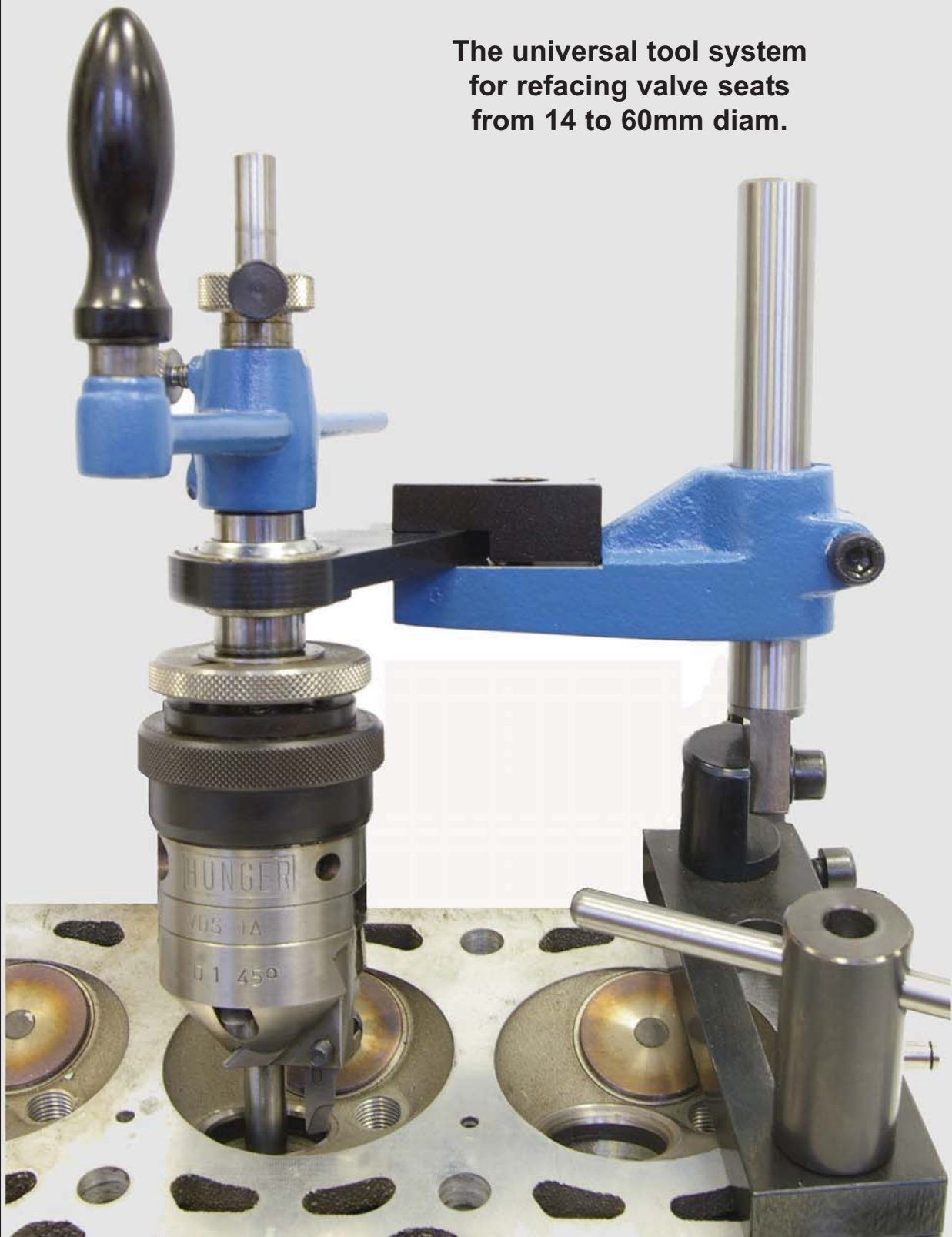
All carbide tipped cutters can be resharpened on standard tool sharpeners.

Roundness, concentricity and surface finish of the refaced seat are within manufacturers' specifications.



Valve Seat Refacing Tool

The universal tool system
for refacing valve seats
from 14 to 60mm diam.



Capacity:

Valve seat diameter range 14 - 60mm
Valve seat angles 45°, 35°, 30°,
25°, 20°, 15° & 0°

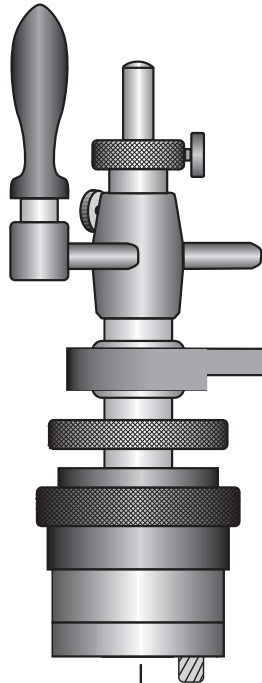
Application:

Motorcycles
Cars
Light commercial vehicles

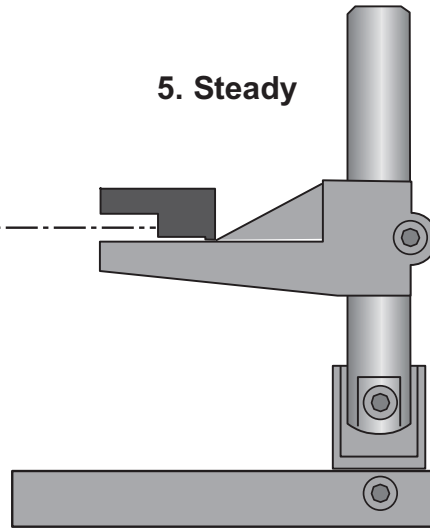


Item. Description	Part No.
1. VDS1A Basic Unit	234 11 002
The gear head of the basic unit is designed to receive an adapter head for the respective seat angle.	
2. Adapter Heads	
Each adapter head includes a tool slide which is guided under an angle corresponding to the valve seat angle.	
D1/45 Adapter Head for 45° seat angle	234 11 120
D1/35 Adapter Head for 35° seat angle	234 14 120
D1/30 Adapter Head for 30° seat angle	234 12 120
D1/25 Adapter Head for 25° seat angle	234 15 120
D1/20 Adapter Head for 20° seat angle	234 17 120
D1/15 Adapter Head for 15° seat angle	234 13 120
D1/0 Adapter Head for 0° angle	234 19 120
Complete Refacing Units:	
consisting of basic unit and mounted adapter head	
VDS 1A/45 Refacing Unit for 45° seat angle	236 21 000
VDS 1A/35 Refacing Unit for 35° seat angle	236 24 000
VDS 1A/30 Refacing Unit for 30° seat angle	236 22 000
VDS 1A/20 Refacing Unit for 25° seat angle	236 25 000
VDS 1A/20 Refacing Unit for 20° seat angle	236 27 000
VDS 1A/15 Refacing Unit for 15° seat angle	236 23 000
VDS 1A/0 Refacing Unit for 0° angle	236 29 000
3. Pilots	pages 9 - 10
VD1 Pilots to be locked in the valve guide are required to align the refacing unit in centerline with the valve guide.	
4. Cutters	
4.1 Cutters for 45°, 35°, 30°, 25° & 20° adapter heads	pages 12 - 17
4.2 Cutters for 15° adapter head	page 17
4.3 Cutters for 0° adapter head	page 32
5. Steady (page 26)	216 55 500
The steady stabilizes the refacing unit just below the crank handle.	
6. Service Tools	
Screwdriver hex 3mm for mounting adapter head	863 19 315
Screwdriver hex 4mm for mounting cutter	863 20 045
Screwdriver hex 6mm for setting up steady	863 20 068
Brush for cleaning valve guide	865 01 001
Tommy bars for mounting pilots	page 10
7. Storage cases	
Storage case type 1A including insert for one refacing unit, adapter head, pilots, cutters and service tools.	236 90 001
Storage case type 1B including insert for two refacing units, adapter head, pilots, cutters and service tools.	236 90 002

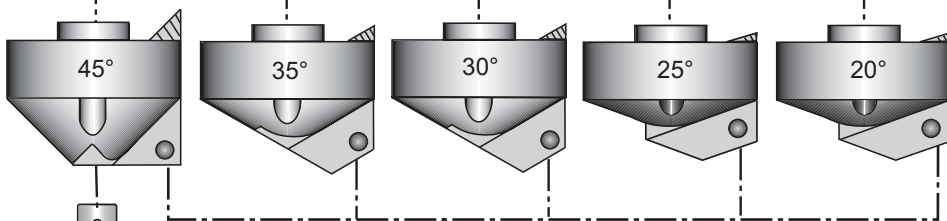
1. Basic Tool



5. Steady



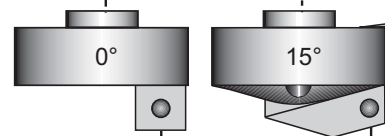
2. Adapter Heads



3. Pilots



4.1 Cutters



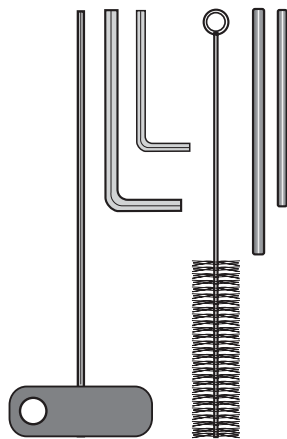
4.3 Cutters



4.2 Cutters



6. Service Tools



7. Storage Case



Valve Seat Refacing Kits

VDS1A Kits are available to match the various requirements. Each kit contains all the items needed in a storage case. The storage case has space for additional pilots and cutters so that the kit can be updated, if new or additional engines are to be serviced. Hunger uses information supplied by various sources to keep the contents of the kits up to date. As specifications are liable to change without prior notice Hunger cannot be held responsible for inaccuracies which may occur from time to time. In addition to the kits listed below Hunger supplies also kits as specified by the customer.

Universal VDS1A Kits

Description	Part No.	Seat angle	Remarks
Basic Kit I	236 03 137	45°	The low cost starting kit for 45° seats
Basic Kit II	236 03 296	45°&30°	The low cost starting kit for 45° & 30° seats
Standard Kit	236 03 100	45°	The complete kit for 45° seats
Master Kit	236 03 300	45°&30°	The complete kit for 45° & 30° seats
Motorcycle Kit	236 03 193	45°	The complete kit for motorcycles
Tractor Kit	236 03 117	45°	The complete kit for tractors

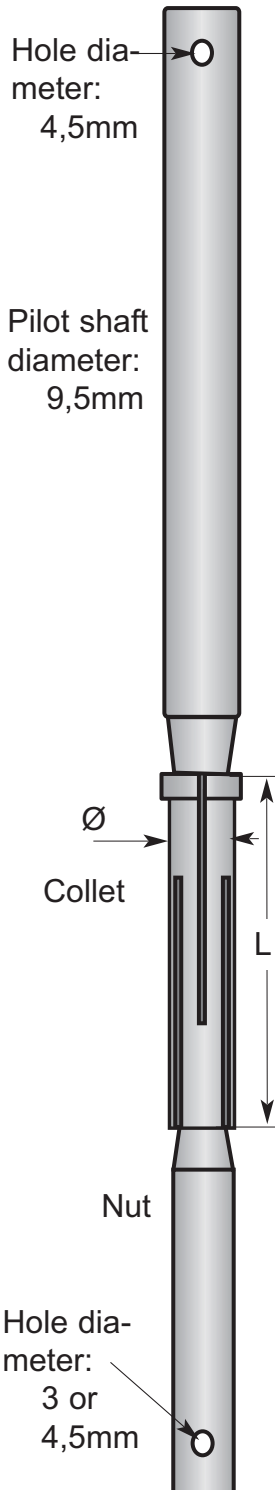
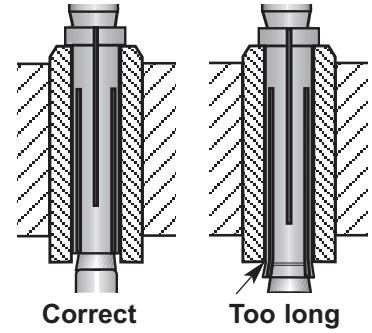
Special VDS1A Kits

Description	Part No.	Seat Angle	Description	Part No.	Seat Angle
Ifa Romeo	236 03 343	45°&30°	Mercedes PKW	236 03 308	45°&30°
BMW PKW	236 03 184	45°	Mitsubishi	236 03 187	45°
BMW Motorrad	236 04 172	45°	MWM	236 03 185	45°
BMW PKW+Mot.	236 03 102	45°	Opel	236 03 112	45°
Citroen	236 03 303	45°&30°	Perkins	236 03 588	45°,35°&30°
Daihatsu	236 03 186	45°	Peugeot	236 03 314	45°&30°
Datsun	236 03 158	45°&30°	Porsche	236 03 713	45°&30°
Fiat / Lancia	236 03 104	45°&30°	Renault PKW	236 03 315	45°&30°
Ford PKW	236 03 105	45°	Saab	236 03 181	45°
Harley Davidson	236 03 130	45°	Skoda	236 03 144	45°
Hatz	236 03 131	45°	Subaru	236 03 199	45°
Honda Motorrad	236 03 162	45°	Suzuki PKW	236 03 134	45°
IHC	236 03 133	45°	Suzuki Motorrad	236 03 129	45°
Kawasaki	236 03 194	45°	Toyota	236 03 160	45°
Lada	236 03 179	45°	VW-Audi	236 03 373	45°
Massey-Ferg.	236 03 136	45°	Volvo PKW	236 03 318	45°&30°
Mazda	236 03 161	45°	Yamaha	236 03 183	45°

Expanding Pilots Series VD1

Expanding pilots are available to fit valve guides from 5,9 to 12,9 mm in diameter.
Two or more collets are available for each pilot size.
Collets of different length L are available for pilot sizes 7/1 - 12/1 to achieve perfect centering in case of very short valve guides.

Important:
When selecting a pilot make sure that the length L is shorter than the length of the valve guide.



Expanding diameter Ø mm	Collet length L mm	Pilot size	Pilot incl. Collet Part No.	Spare & add. collets Part No.
5,4 - 5,65	35	5/1	216 71 101	216 71 501
5,65 - 5,9	35	↓		216 71 506
5,9 - 6,2	35	6/1	216 71 102	216 71 502
6,2 - 6,5	35	↓		216 71 503
6,4 - 6,65	35	↓		216 71 504
6,65 - 6,9	35	↓		216 71 505
6,9 - 7,2	35	7/1	216 75 112	216 75 512
↓	42	↓	216 71 112	216 71 512
7,2 - 7,5	35	↓		216 75 513
↓	42	↓		216 71 513
7,4 - 7,65	35	↓		216 75 514
↓	42	↓		216 71 514
7,65 - 7,9	35	↓		216 75 515
↓	42	↓		216 71 515
7,9 - 8,4	38	8/1	216 75 122	216 75 522
↓	52	↓	216 71 122	216 71 522
8,4 - 8,9	38	↓		216 75 523
↓	52	↓		216 71 523
8,9 - 9,4	44	9/1	216 75 132	216 75 532
↓	59	↓	216 71 132	216 71 532
9,4 - 9,9	44	↓		216 75 533
↓	59	↓		216 71 533
9,9 - 10,4	48	10/1	216 75 142	216 75 542
↓	68	↓	216 71 142	216 71 542
10,4 - 10,9	48	↓		216 75 543
↓	68	↓		216 71 543
10,9 - 11,4	48	11/1	216 75 147	216 75 547
↓	76	↓	216 71 147	216 71 547
11,4 - 11,9	48	↓		216 75 548
↓	76	↓		216 71 548
11,9 - 12,4	56	12/1	216 75 152	216 75 552
↓	84	↓	216 71 152	216 71 552
12,4 - 12,9	56	↓		216 75 553
↓	84	↓		216 71 553

Solid Pilots



Solid pilots are available especially for small valve guide diameters. A solid pilot has a slow taper to fit exactly the respective valve guide. The following solid pilots are normally available ex stock:

Valve guide diam. mm	Solid Pilot Part No.
4,000	216 72 516
4,490	216 72 512
4,500	216 72 513
4,990	216 72 499
5,000	216 72 511
5,020	216 72 500
5,470	216 72 507
5,480	216 72 508
5,490	216 72 006
5,500	216 72 502
5,510	216 72 005
5,520	216 72 509
5,530	216 72 003
6,000	216 72 001
7,000	216 72 011
8,000	216 72 021

Tommy Bars

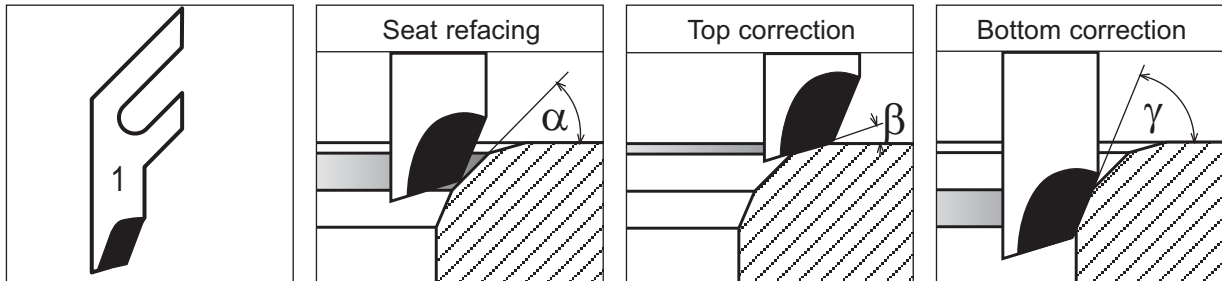
Tommy bars are required for mounting and demounting expanding pilots and for withdrawing solid pilots from the valve guides.



Description	Part No.	Fitting in
Tommy Bar Ø 3 mm	216 91 300	Pilot nut sizes 5 - 8
Tommy Bar Ø 4,5 mm	216 91 450	Pilot shaft VD1 and pilot nut sizes 9 - 16
Tommy Bar Ø 6 mm	217 91 600	Pilot shaft VD2 and pilot nut sizes 17 - 18

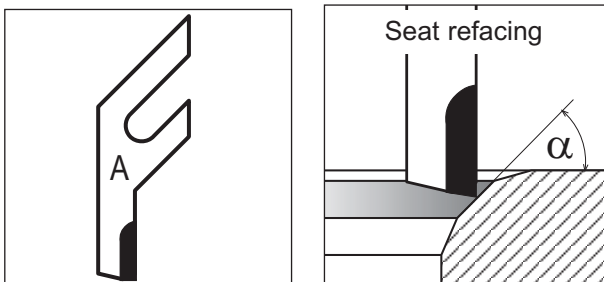
Cutters of different length, width and cutting geometry are available to cut valve seats of different size, shape and location.

1. Cutters for seat refacing and correction



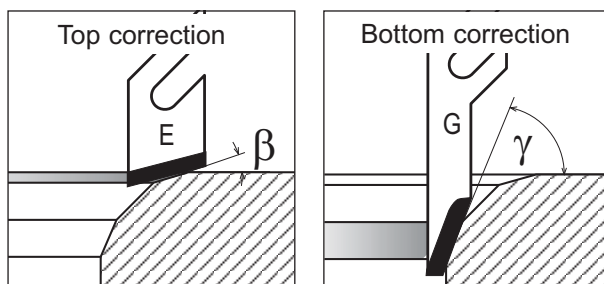
In addition to single point refacing of the valve seat the primary and/or secondary cutting edges of this cutter type are designed for machining the top and/or bottom edges of the valve seat under the proper angle.

2. Cutters for seat refacing only



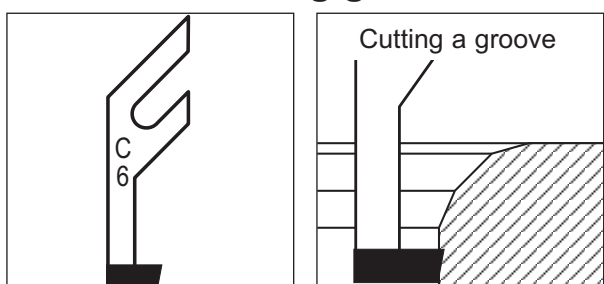
This type is designed for cutting only the valve seat surface. The cutting edge geometry of this cutter type is optimized to cut hard-to-face seat materials properly.

3. Cutters for correction only











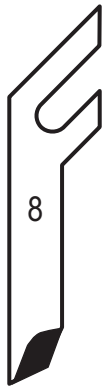
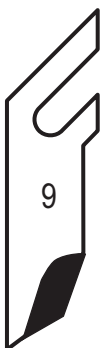


This type of cutter is designed for correcting only. The angle of correction is defined by the proper inclination of the cutting edge. Cutters 24, 24M, 30, C42, C82, E, E2, F, F1, F4, F5, F10, G and H belong to this type of cutters.

4. Cutters for cutting grooves

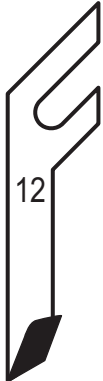
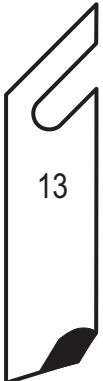





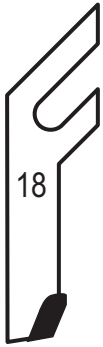






This type of cutter is designed for cutting a groove into the valve seat ring so that a suitable tool can be applied to remove the valve seat ring. Cutters C6 and C6.1 belong to this type of cutters.

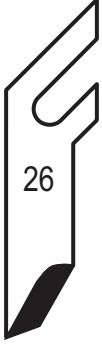

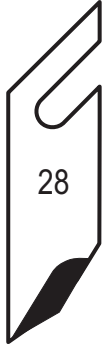

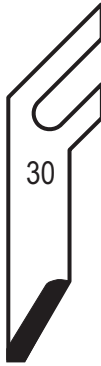

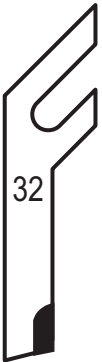
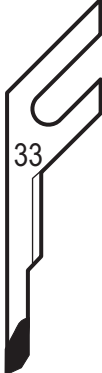
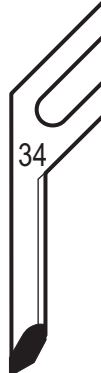


Cutters for 45°, 30°, 35°, 25° and 20° adapter heads

Type	1	1M	2	3	4	5
Order-No.	216 64 110	216 64 112	216 64 130	216 64 210	216 64 230	216 64 460
for seat diam. mm	22 - 38	20 - 36	32 - 48	22 - 38	32 - 48	32 - 48
Refacing seats	yes	yes	yes	yes	yes	yes
Top correction	15°	15°	15°	15°	15°	15°
Bottom correcton	75°	75°	75°	75°	75°	75°
Seat location	surface	surface	surface	recessed	recessed	recessed
Application	universal	universal Mercedes	universal	universal	universal	universal
Drawn to scale						
Type	6	7	8	9	10	11
Order-No.	216 64 610	216 64 211	216 64 212	216 64 231	216 64 620	216 64 621
for seat diam. mm	26 - 42	20 - 36	22 - 38	28 - 44	28 - 44	48 - 60
Refacing seats	yes	yes	yes	yes	yes	yes
Top correction	15°	15°	25°	30°	35°	15°
Bottom correcton	75°	75°	75°	75°	75°	75°
Seat location	recessed	recessed	recessed	recessed	surface	universal
Application	Fiat Lancia	Fiat Lancia Citroen Mot.cycle	Harley Opel	universal	universal	universal
Drawn to scale						





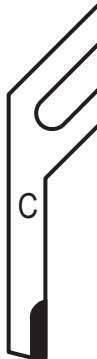



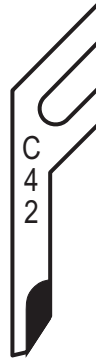



Cutters for 45°, 30°, 35°, 25° and 20° adapter heads

Type	12	13	14	15	15M	16
Order-No.	216 64 622	216 64 623	216 64 624	216 64 625	216 64 208	216 64 631
for seat diam. mm	22 - 38	32 - 48	20 - 36	20 - 36	20 - 36	22 - 38
Refacing seats	yes	yes	yes	yes	yes	yes
Top correction	30°	15°	0°	15°	15°	30°
Bottom correcton	75°	60°	60°	75°	65°	65°
Seat location	recessed	recessed	recessed	recessed	recessed	recessed
Application	Mazda Opel Perkins Toyota	BMW Mercedes Peugeot		Audi VW	Mercedes	Mitsubishi Toyota
Drawn to scale						
Type	17	18	23M	24	24M	25
Order-No.	216 64 626	216 64 611	216 64 235	216 64 233	216 62 170	216 64 132
for seat diam. mm	24 - 40	26 - 42	22 - 38	30 - 60	20 - 40	15 - 31
Refacing seats	yes	yes	yes	no	no	yes
Top correction	15°	11°	35°	r=7,5mm	35°	0°
Bottom correcton	80°	75°	60°			58°
Seat location	recessed	recessed	recessed	recessed	recessed	recessed
Application	Ford Renault	Saab	Mercedes		Mercedes	Mazda Suzuki
Drawn to scale						

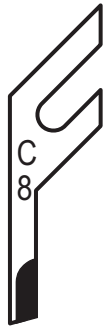


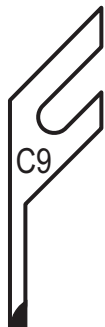


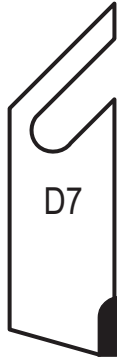



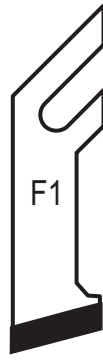

Cutters for 45°, 30°, 35°, 25° und 20° adapter heads

Type	26	27	28	29	30	31
Order-No.	216 64 627	216 64 214	216 64 234	216 64 113	216 64 133	216 64 134
for seat dia. mm	22 - 38	20 - 36	25 - 42	22 - 38	16 - 40	28 - 44
Refacing seats	yes	yes	yes	yes	no	yes
Top correction	20°	30°	30°	0°	-	35°
Bottom correcton	60°	60°	60°	65°	60°	-
Seat location	recessed	recessed	recessed	surface	recessed	recessed
Application	Yamaha	Datsun Mazda Kawasaki	Daihatsu Datsun Mazda Kawasaki	BMW	BMW Kawasaki Subaru	BMW Kawasaki Subaru
Drawn to scale						
Type	32	33	34	35	36	
Order-No.	216 64 215	216 64 216	216 64 217	216 64 218	216 64 636	
for seat dia. mm	23 - 41	16 - 32	18 - 34	20 - 36	20 - 36	
Refacing seats	yes	yes	yes	yes	yes	
Top correction	15°	30°	30°	25°	15°	
Bottom correcton	-	60°	60°	60°	60°	
Seat location	recessed	recessed	recessed	recessed	recessed	
Application	Mercedes Porsche	Porsche	Porsche	Porsche	BMW	
Drawn to scale						


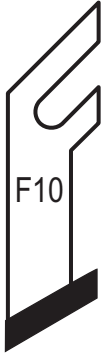


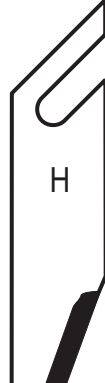
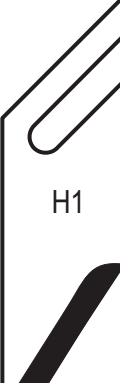
Cutters for 45°, 30°, 35°, 25° und 20° adapter heads

Type	A	A1	B	B1	C	C1
Order-No.	216 61 110	216 61 112	216 61 130	216 61 131	216 61 210	216 61 560
for seat dia. mm	20 - 40	25 - 42	34 - 54	48 - 60	20 - 40	17 - 37
Refacing seats	yes	yes	yes	yes	yes	yes
Top correction	-	-	-	-	-	-
Bottom correcton	-	-	-	-	-	-
Seat location	surface	surface	surface	surface	recessed	recessed
Application	universal	universal	universal	universal	universal	universal
Drawn to scale						
Type	C4	C4-1	C4-2	C6	C6-1	C7
Order-No.	216 69 310	216 69 311	216 69 312	216 69 210	216 69 215	216 69 211
for seat dia. mm	20 - 38	20 - 38	15 - 30	27 - 48	24 - 43	15 - 34
Refacing seats	yes	yes	no	no	no	yes
Top correction	15°	30°	-	-	-	-
Bottom correcton	-	-	60°	-	-	-
Seat location	recessed	recessed	recessed	universal	universal	recessed
Application	Opel Renault Volvo	universal	universal	cutting grooves	cutting grooves	Mot.cycles
Drawn to scale						

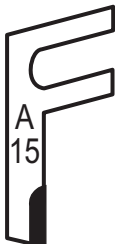
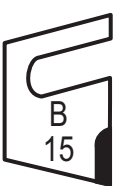
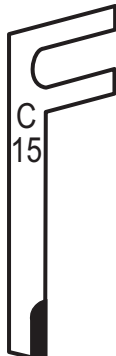
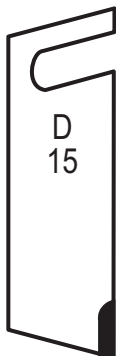
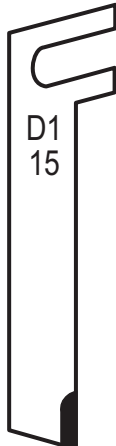
Cutters for 45°, 30°, 35°, 25° und 20° adapter heads

Type	C8	C8-1	C8-2	C9	D	D2
Order-No.	216 69 212	216 69 213	216 69 214	216 69 413	216 61 230	216 61 431
for seat dia. mm	17 - 37	17 - 37	12 - 30	14 - 34	34 - 54	24 - 44
Refacing seats	Ja	Ja	no	Ja	Ja	Ja
Top correction	15°	30°	-	-	-	-
Bottom correcton	-	-	60°	-	-	-
Seat location	recessed	recessed	recessed	recessed	recessed	recessed
Application	Mazda Toyota Mot.cycles	universal	universal	universal	universal	universal
Drawn to scale						
Type	D7	E	E2	F	F1	F4
Order-No.	216 61 232	216 62 150	216 62 160	216 62 210	216 62 230	216 62 610
for seat dia. mm	38 - 58	20 - 52	35 - 52	20 - 37	35 - 52	20 - 37
Refacing seats	Ja	no	no	no	no	no
Top correction	-	15	0°	15°	15°	30°
Bottom correcton	-	-	60°	-	-	-
Seat location	recessed	recessed	recessed	recessed	recessed	surface
Application	universal	universal	universal	universal Ford Lada	universal	universal
Drawn to scale						

Cutters for 45°, 30°, 35°, 25° und 20° adapter heads

Type	F5	F10	G	G0	H	H1
Order-No.	216 62 231	216 62 235	216 62 310	216 62 310.1	216 62 330	216 62 331
for seat dia. mm	20 - 37	35 - 52	20 - 37	20 - 37	35 - 52	22 - 52
Refacing seats	no	no	no	yes	no	no
Top correction	25°	30°	-	0°	-	15°
Bottom correcton	-	-	75°	75°	75°	60°
Seat location	recessed	recessed	universal	universal	universal	universal
Application	universal	Harley Porsche	universal	universal	universal	Harley
Drawn to scale						


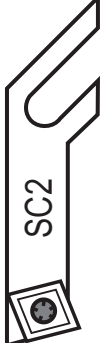
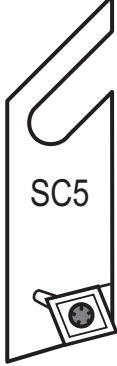
Cutters for 15° adapter head

Type	A/15	B/15	C/15	D/15	D1/15
Order-No.	216 61 120	216 61 140	216 61 220	216 69 211	216 69 212
for seat dia. mm	20 - 40	38 - 58	20 - 40	38 - 58	28 - 48
Seat location	surface	surface	recessed	recessed	recessed
Application	universal	universal	universal	universal	universal
Drawn to scale					

Cutters for 45°, 30°, 35°, 25° and 20° adapter heads

**SC Cutters with indexable inserts
for hard seats**

The SC type cutters are furnished with indexable carbide inserts.
The indexable inserts are coated with TiN and are specifically provided for cutting the hard seat materials as used in modern engines.
If the insert is too dull or chipped, index insert or install a new insert.

<p>Type Part No. For seat dia. mm Seat refacing Top correction Bottom correction Seat location Application</p>	<p>SC1 216 65 110 23 - 43 yes - - surface & recessed universal</p>	<p>SC2 216 65 100 28 - 48 yes - - surface & recessed universal</p>	<p>SC5 216 65 120 40 - 60 yes - - surface & recessed universal Harley</p>
<p>Drawn to scale</p>			
<p>Scope of supply: Cutter consisting of Toolholder Cutting insert Clamping screw Torx screwdriver</p>	<p>Part No. 216 65 110 216 65 001 862 20 004 809 71 026 863 22 002</p>	<p>Part No. 216 65 100 216 65 002 862 20 003 809 71 025 863 22 001</p>	<p>Part No. 216 65 120 216 65 003 862 20 003 809 71 025 863 22 001</p>

Valve Seat Refacing Tool

The universal tool system
for refacing valve seats
from 30 to 90mm diam.



Capacity:

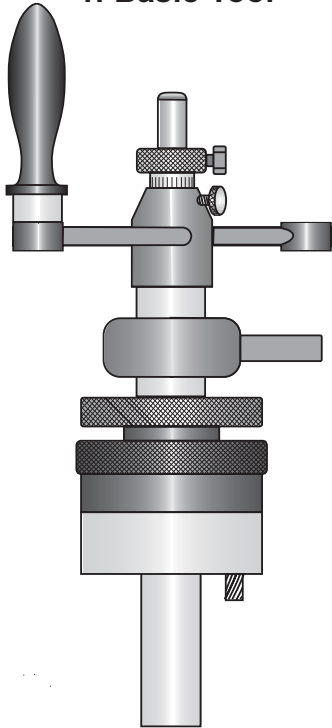
Valve seat diameter range 30 - 90mm
Valve seat angles 45°, 35°, 30°,
25°, 20°, 15° & 0°

Application:

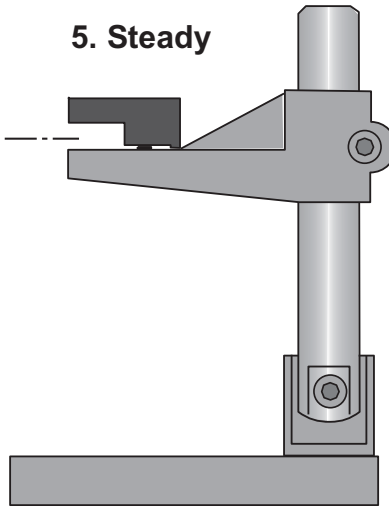
Commercial vehicles
Locomotives
Marine and stationary diesels

Item Description	Part No.	
1. VDS2 Basic Tool	237 10 002	
The gear head of the basic unit is designed to receive an adapter head for the respective seat angle.		
2. Adapter Heads		
The adapter head includes a tool slide which is guided under an angle corresponding to the valve seat angle.		
D2/45 Adapter Head for 45° seat angle	237 11 145	
D2/35 Adapter Head for 35° seat angle	237 14 135	
D2/30 Adapter Head for 30° seat angle	237 12 130	
D2/25 Adapter Head for 25° seat angle	237 15 125	
D2/20 Adapter Head for 20° seat angle	237 17 120	
D2/15 Adapter Head for 15° seat angle	237 13 115	
D2/0 Adapter Head for 0° angle	234 19 100	
Complete Refacing Units:		
consisting of basic unit and mounted adapter head		
VDS 2/45 Refacing Unit for 45° seat angle	237 21 000	
VDS 2/35 Refacing Unit for 35° seat angle	237 24 000	
VDS 2/30 Refacing Unit for 30° seat angle	237 22 000	
VDS 2/20 Refacing Unit for 25° seat angle	237 25 000	
VDS 2/20 Refacing Unit for 20° seat angle	237 27 000	
VDS 2/15 Refacing Unit for 15° seat angle	237 23 000	
VDS 2/0 Refacing Unit for 0° angle	237 29 000	
3. Pilots	page 22	
A pilot series VD2 is required for aligning the refacing unit		
4. Cutters		
4.1 Cutters for 45°, 35°, 30°, 25° & 20° adapter heads	pages 23 - 24	
4.2 Cutters for 15° adapter head	page 17	
4.3 Cutters for 0° adapter head	page 32	
5. Steady (page 26)	216 55 500	
6. Service Tools		
Wrench SW 10 for setting up the refacing unit	863 01 010	
Screwdriver hex 4mm for mounting cutter	863 20 045	
Screwdriver hex 6mm for setting up steady	863 20 068	
Brush for cleaning valve guide	865 01 001	
Tommy bars for mounting pilots	page 10	
7. Storage case type 2A	217 90 041	
8. Kits		
Each kit comprises all items for the particular engine make to be serviced.		
VDS2 Kit Iveco	Seat angle 25°, 30° & 45°	237 03 156
VDS2 Kit Mercedes Trucks	Seat angle 20°, 30° & 45°	217 03 127
VDS2 Kit Scania	Seat angle 20°, 30° & 45°	237 03 150
VDS2 Kit Steyr	Seat angle 35° & 45°	237 03 001
VDS2 Standards Kit	Seat angle 20°, 30° & 45°	237 03 800

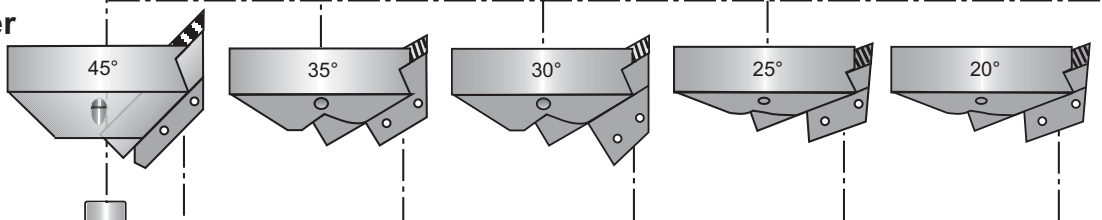
1. Basic Tool



5. Steady



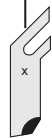
2. Adapter Heads



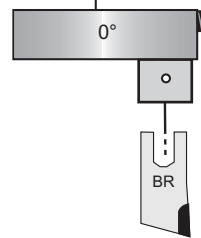
3. Pilot



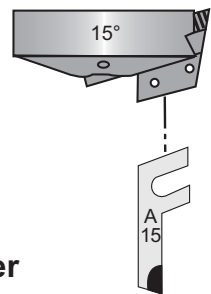
4.1 Cutter



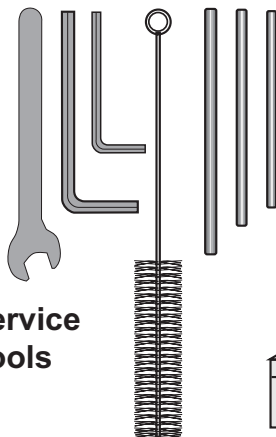
4.3 Cutter



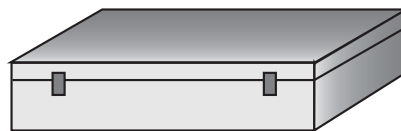
4.2 Cutter



6. Service Tools



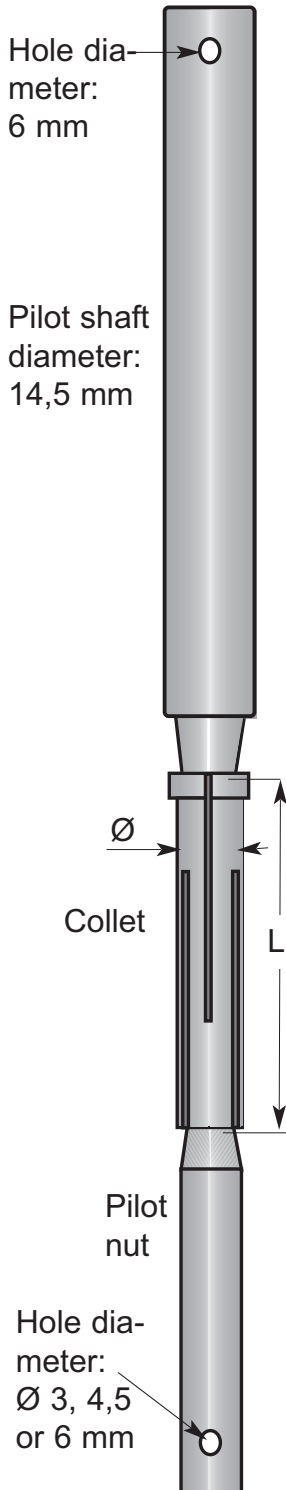
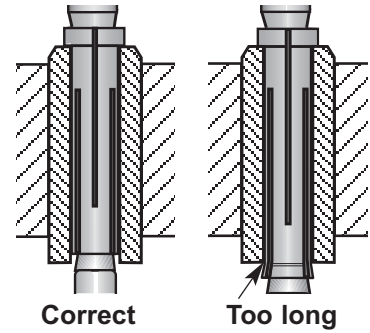
7. Storage Case



Expanding Pilots Series VD2







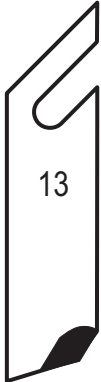
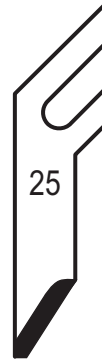


Expanding pilots are available to fit valve guides from 7,9 to 18,9 mm in diameter.
Two or more collets are available for each pilot size.
Collets of different length L are available for pilot sizes 8/2 - 12/2 to achieve perfect centering in case of very short valve guides.

Important:
When selecting a pilot make sure that the length L is shorter than the length of the valve guide.





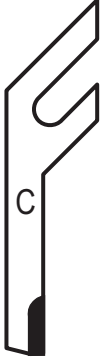
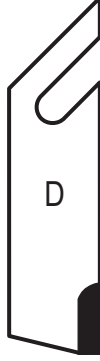

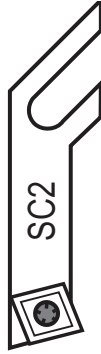
Expanding diameter Ø mm	Collet length L mm	Pilot size	Pilot incl. Collet Part No.	Spare & add. collets Part No.
7,9 - 8,4	38	8/2	217 75 122	216 75 522
↓	52	↓	217 71 122	216 71 522
8,4 - 8,9	38	↓		216 75 523
↓	52	↓		216 71 523
8,9 - 9,4	44	9/2	217 75 132	216 75 532
↓	59	↓	217 71 132	216 71 532
9,4 - 9,9	44	↓		216 75 533
↓	59	↓		216 71 533
9,9 - 10,4	48	10/2	217 75 142	216 75 542
↓	68	↓	217 71 142	216 71 542
10,4 - 10,9	48	↓		216 75 543
↓	68	↓		216 71 543
10,9 - 11,4	48	11/2	217 75 147	216 75 547
↓	76	↓	217 71 147	216 71 547
11,4 - 11,9	48	↓		216 75 548
↓	76	↓		216 71 548
11,9 - 12,4	56	12/2	217 75 152	216 75 552
↓	84	↓	217 71 152	216 71 552
12,4 - 12,9	56	↓		216 75 553
↓	84	↓		216 71 553
12,9 - 13,4	92	13/2	217 71 157	217 71 557
13,4 - 13,9	92	↓		217 71 558
13,9 - 14,4	100	14/2	217 71 162	217 71 562
14,4 - 14,9	100	↓		217 71 563
14,9 - 15,4	108	15/2	217 71 167	217 71 567
15,4 - 15,9	108	↓		217 71 568
15,9 - 16,4	108	16/2	217 71 172	217 71 572
16,4 - 16,9	108	↓		217 71 573
16,9 - 17,9	116	17/2	217 71 076	217 71 576
17,9 - 18,9	116	18/2	217 71 078	217 71 578

**Cutters for 45°, 35°, 30°, 25° and 20° adapter heads
for seat refacing and correction**

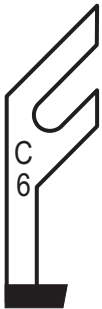

Type	1	1M	2	3	4	5
Part No.	216 64 110	216 64 112	216 64 130	216 64 210	216 64 230	216 64 460
for seat dia. mm	35 - 60	30 - 60	45 - 90	35 - 60	45 - 90	45 - 90
Refacing seats	yes	yes	yes	yes	yes	yes
Top correction	15°	15°	15°	15°	15°	15°
Bottom correcton	75°	75°	75°	75°	75°	75°
Seat location	surface	surface	surface	recessed	recessed	recessed
Application	universal	universal Mercedes	universal	universal	universal	universal
Drawn to scale						
Type	13	25	32	C8		
Part No.	216 64 623	216 64 132	216 64 215	216 64 212		
for seat dia. mm	45 - 90	28 - 60	35 - 80	28 - 70		
Refacing seats	yes	yes	yes	yes		
Top correction	15°	0°	15°	15°		
Bottom correcton	58°	58°	-	-		
Seat location	recessed	recessed	recessed	recessed		
Application	Mercedes	MAN	universal Mercedes	universal Mercedes		
Drawn to scale						

Cutters

**Cutters 45°, 35°, 30°, 25° and 20° adapter heads
for seat refacing only**

Typ	A	B	C	D	SC1	SC2
Part No.	216 61 110	216 61 130	216 61 210	216 61 230	216 65 110	216 65 100
for seat dia. mm	35 - 60	45 - 90	35 - 60	45 - 90	35 - 75	40 - 85
Refacing seats	yes	yes	yes	yes	yes	yes
Top correction	-	-	-	-	-	-
Bottom correction	-	-	-	-	-	-
Seat location	surface	surface	recessed	recessed	universal	universal
Application	universal	universal	universal	universal	universal	universal
Drawn to scale						

**Cutters for 45°, 35°, 30°, 25° and 20° adapter heads
for cutting a groove into the valve seat ring**

Type	C6	C6.1
Part No.	216 69 210	216 69 215
for seat dia. mm	36 - 80	29 - 70 *
Seat location	universal	Mercedes
Drawn to scale		
		* from 29 mm with 30° adapter head

Valve Seat Refacing Tool

The competitive tool for refacing
30° and 45° valve seats
from 30 to 90mm diameter



Capacity:

Valve seat diameter range 30 - 90mm
Valve seat angles 45° and 30°

Application:

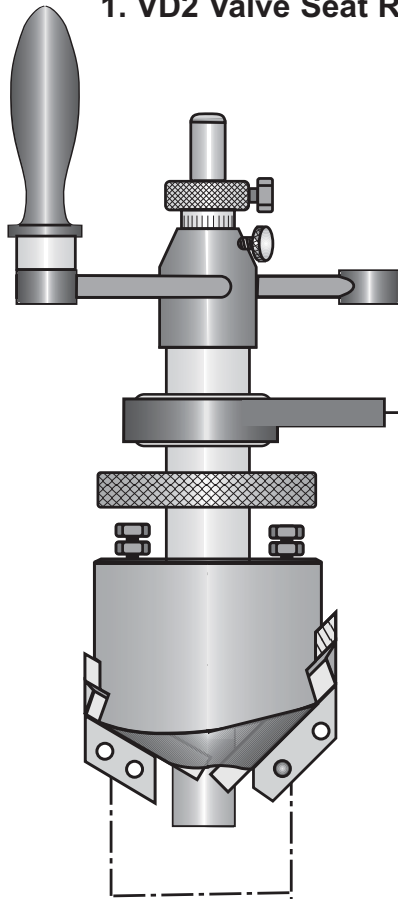
Commercial vehicles
Locomotives
Marine and stationary diesels

The VD 2 features a head including a 45° tool slide and a 30° tool slide guided in dovetailed slideways which are inclined under an angle of 45° and 30°, respectively.

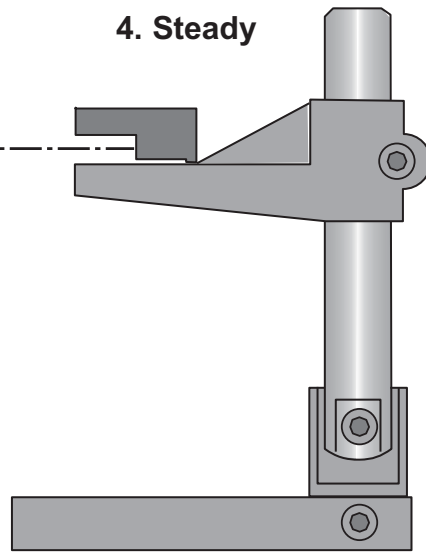
Item. Description	Part No.
1. VD2 Refacing Tool for 45° & 30° Seats	217 21 000
2. Pilots	page 22
A pilot series VD2 is required for aligning the refacing unit in centerline with the valve guide.	
3. Cutters	pages 23 - 24
A wide range of cutters are available to match every requirement	
4. Steady (page 26)	216 55 500
The steady supports the refacing unit just below the crank handle.	
5. Service Tools	
Wrench SW 10 for setting up the refacing unit	863 01 010
Screwdriver hex 4mm for mounting cutter	863 20 045
Screwdriver hex 6mm for setting up steady	863 20 068
Brush for cleaning valve guide	865 01 001
Tommy bars for mounting pilots	page 10
6. Storage case type 2A	217 90 041
7. Kits	
Each kit comprises all items for the particular engine make to be serviced.	
VD2 Kit DAF LKW	217 03 107
VD2 Kit Ford LKW	217 03 126
VD2 Kit MAN	217 03 105
VD2 Standard Kit	217 03 100

Further special kits are available for Deutz, MTU - and Pielstick engines.

1. VD2 Valve Seat Refacing Tool



4. Steady



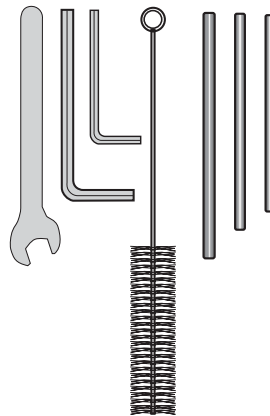
2. Pilot



3. Cutter



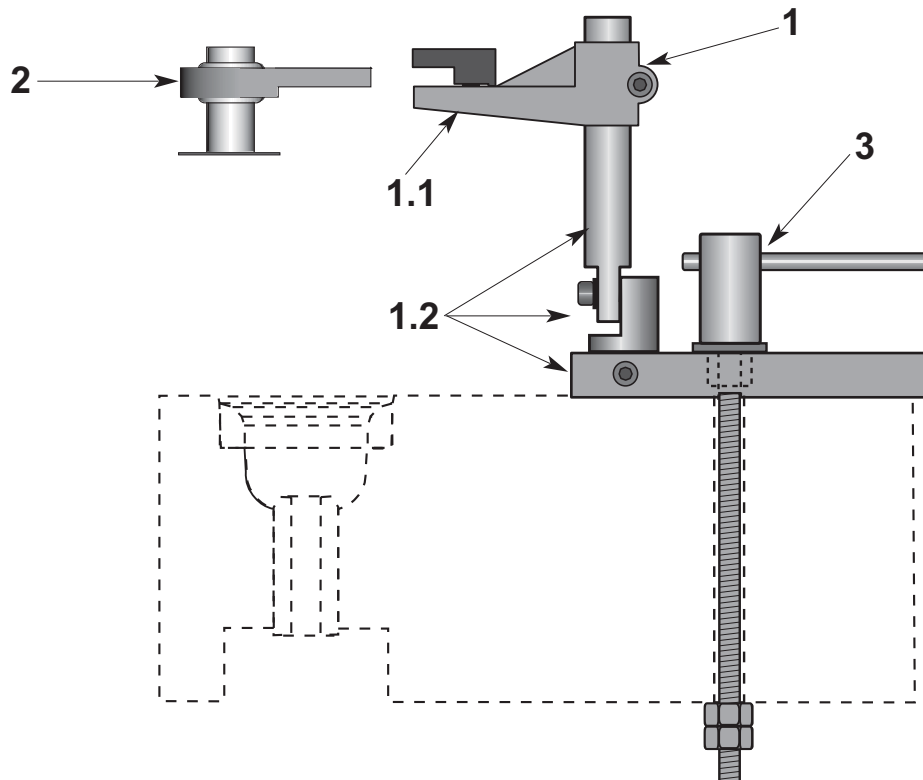
5. Service Tools



6. Storage Case



Steady



The swivelling guide arm (2) of a refacing unit can be locked in place by means of the steady which prevents lateral displacement of the refacing unit.

The older types VD1 and VD2 refacing units have ball-type guide arms.

The ball-type guide arm can be replaced by the more convenient swivelling guide arm. Conversion kits are available for the VD 1 and VD 2 models.

A new steady clamp (1.1) is required when replacing the ball-type guide arm.

We suggest to procure the complete new steady (1) shown above which is more versatile than the old steady

A rapid clamp (3) is available to clamp the base member of the steady to the cylinder head. The rapid clamp includes an adjustable clamping lever.

Item	Description	Part No.
1.	Steady consisting of	216 55 500
1.1	Steady Clamp	216 55 220
1.2	Base Member with universal joint and post	216 55 510
2.	Conversion Kit for VD1	216 21 700
	Conversion Kit for VD2	217 21 700
3.	Rapid Clamp	216 55 520

The precision tool
for counterboring and refacing
the seat ring bores
in cylinder heads



Type RDS 1

Capacity:

Bore diameter range: 20 - 60mm

Application:

Motorcycles

Cars

Light commercial vehicles

The Hunger RDS1 is designed to precision machine the seat ring counterbores in cylinder heads to produce smooth and closely fitting contact surfaces for new seat inserts. The RDS1 is equipped for turning inside diameter as well as facing bottom of the seat ring counterbores in a lathe-type action with a single point carbide cutter.

The RDS1 is aligned in centerline with the valve guide by means of a pilot which is locked in the valve guide. An universal steady stabilizes the RDS1 against lateral displacement.

Pilots and steady for the Hunger VDS1A Valve Seat Refacing Tool also suit for the RDS1 Counterboring Tool.

The built-in feed gear mechanism for automatic axial and cross feed of the single point cutter eliminates the need for multiple cutter sets and other accessories.

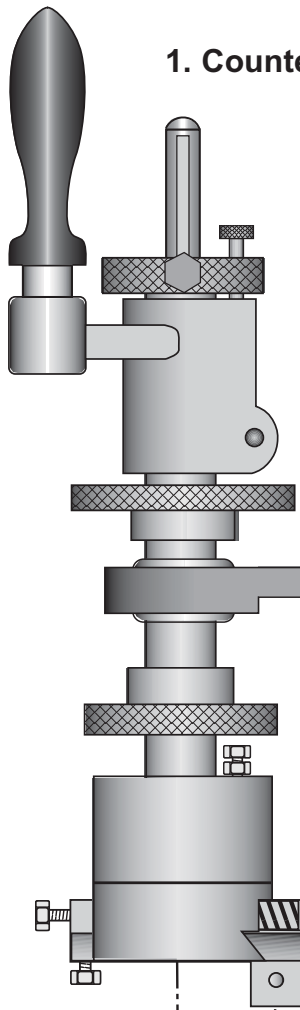
The feed rate per revolution of the cutter is 0,06 mm ensuring perfect surface finish.

An adjustable stop for the tool slide permits quick selection of the proper sized counterbore diameter.

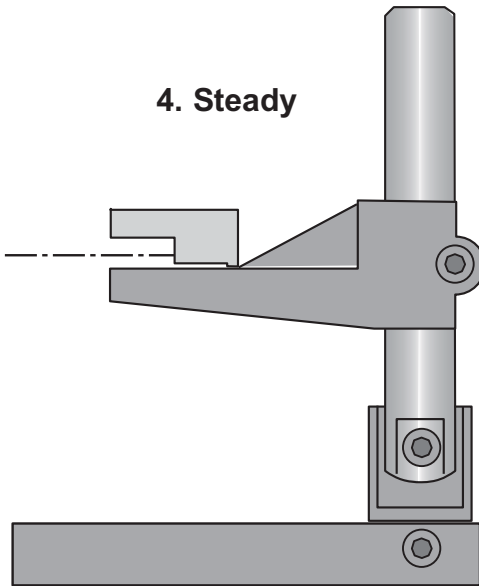
Hunger RDS 1 - Order Information

Item	Description	Part No.
1.	RDS1 Counterboring Tool	219 20 000
2.	Pilots Series VD1	See pages 9 - 10
3.	Cutters	See page 32
4.	Universal Steady	See page 28
5.	Service Tools	
	Wrench (7mm) for setting up RDS 1	863 01 007
	Hex Key (4mm) for mounting cutter	863 20 045
	Tommy bars for installing pilots	See page 10
6.	Storage Case for RDS 1	219 90 044
-	RDS1 Kit	219 00 100
	including RDS1 tool, cutter types AR, BR, CR, DR and service tools packed in the sturdy storage case	

1. Counterboring Tool



4. Steady



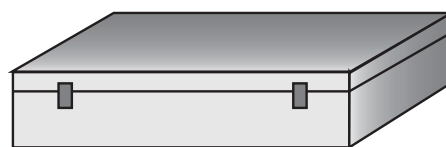
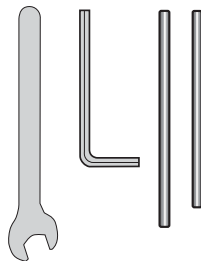
3. Cutter



2. Pilot



5. Service Tools







6. Storage Case

Cutters




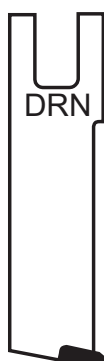
Cutters for Counterboring and Refacing

These cutters are also required for the adapter heads D1/0° und D2/0° of the VDS1A und VDS2 refacing flat surfaces.

Type	AR	BR	CR	DR
Part No.	219 61 110	219 61 130	219 61 210	219 61 230
for bore dia. mm:				
with RDS 1	20 - 37	35 - 60	20 - 37	35 - 60
with RDS 2	35 - 60	45 - 90	35 - 60	45 - 90
Seat location	surface	surface	recessed	recessed
Drawn to scale				

Cutters for cutting grooves

These cutters are designed for cutting a groove into a valve seat ring so that a suitable tool can be applied for removing the seat ring.

Type	ARN	BRN	CRN	DRN
Part No.	219 61 120	219 61 132	219 61 213	219 61 232
for bore dia. mm:				
with RDS 1	20 - 37	35 - 60	20 - 37	35 - 60
with RDS 2	35 - 60	45 - 90	35 - 60	45 - 90
Seat location	surface	surface	recessed	recessed
Drawn to scale				



Hunger BDW
for refacing cylinder liner seatings
from 90 to 180mm

Automatic centering
by the mere turn
of the centering spindle.

Rigid mechanical mounting
of the refacing tool
by using the studs at the
cylinder block.

Automatic cross feed
at each turn of the
crank handle.

Adjustable depth stop
for refacing all seatings
to the preset depth.

Type BDW MAN (Standard Kit)
including mounting

Capacity:

Refacing diam. range: 90 - 180 mm

Application:

MAN and other engines

Order Information:

Part No. 222 60 501

Type BDW Deutz

including mounting cross

Capacity:

Refacing diam. range: 90 - 180 mm

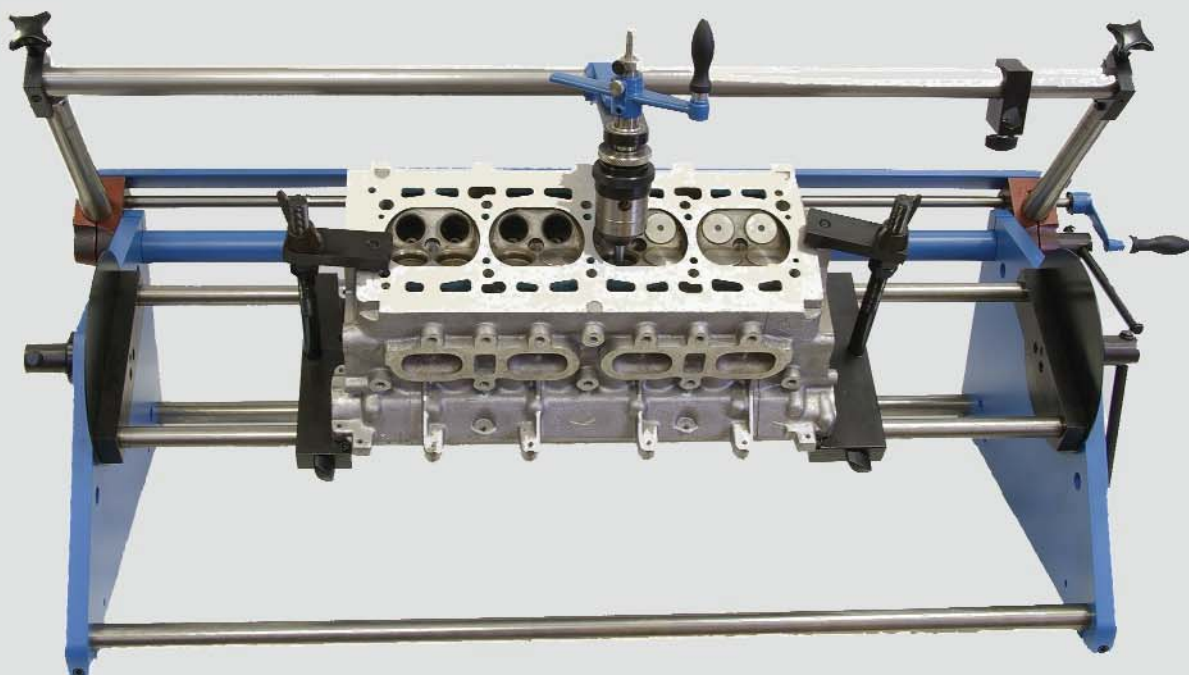
Application:

Deutz engines

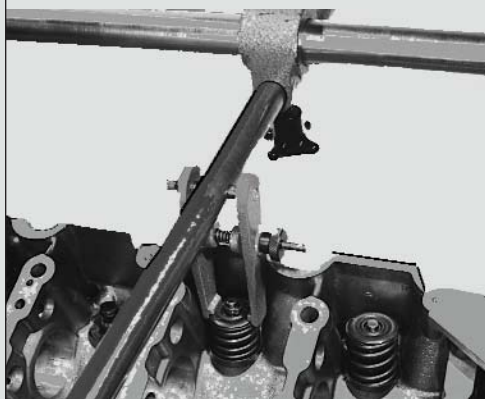
Order Information:

Part No. 222 50 000

**Removing valves,
Servicing valve seats and valve guides,
Installing valves.
An unique support for all jobs.**



Including accessories for compressing the valve springs



K2000 Cylinder Head Stand

The universal support for cylinder heads up to 820mm length.

Application:

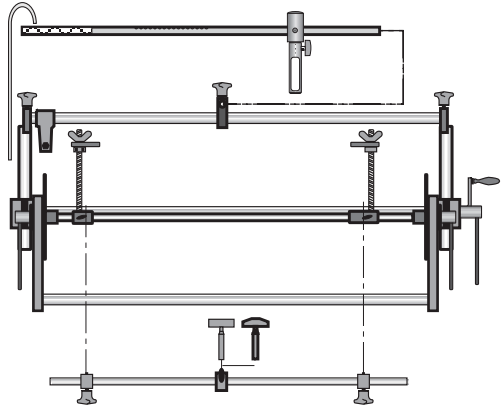
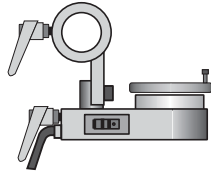
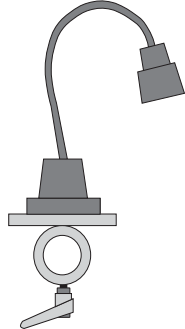




Motorcycle engine service
Car engine service
Truck engine service

Dimensions and Weight

Length	1170 mm
Width	530 mm
Height	440 - 580 mm
Net weight	approx. 60 kg

Recommended

by leading engine manufacturers

Item	Description	Part No.	Picture
1.	K2000 Cylinder Head Stand including a clamp for locking the swivelling guide arm of a VD valve refacing unit, valve spring lifting attachment and valve stop attachment for keeping the valves in place when compressing the valve springs.	221 00 100	
2.	Electromagnetic Support for locking the swivelling guide arm of a VD valve seat refacing unit. Includes a 24 V power supply unit for connection to 220 - 240 V AC.	221 40 100	
3.	Work Light including clamping attachment for mounting to the head stand. The work light is equipped with a halogen lamp (12V, 20W). Includes a safety transformer for connection to 220 V AC.	221 90 100	
4.	Plunger Ø 22mm for compressing valve springs located in narrow recesses sind.	221 20 058	
5.	Plunger Ø 30 mm for compressing very large valve springs	221 20 054	
6.	Items for updating cylinder head stands supplied before 1996:		
	Swivelling holder	221 20 052	
	Plunger Ø 26 mm	221 20 056	

Hunger VKS16

the compact machine
for workshops



Specifications:

Grinding Spindle:

Wheel diameter	175 mm
Wheel speed at 50Hz	2790 min ⁻¹
Drive motor	370 W

Work Spindle:

Speed at 50Hz	120 min ⁻¹
Drive motor	42 W

Wet Grinding

Coolant capacity	5 l
Coolant pump motor	50 W

Dimensions & Weight:

Overall width	600 mm
Overall depth	650 mm
Overall height	480 mm
Net weight	98 kg

Capacity:

Valve stem diameter	3 - 16 mm
Max. valve head diameter	120 mm

Application:

Motorcycles
Cars and Commercial Vehicles
Marine and Stationary Diesels



Valve Grinding Machine

Machine Base:

Heavily ribbed cast iron structure for vibration-free performance. Integrated slideways for wheelhead traverse and workhead infeed .

Wheelhead:

The precision motor grinding spindle is permanently sealed and lubricated.

Workhead:

Single precision chuck for perfect valve alignment throughout the large chucking range. No collets! The workhead is located on a swivel plate which can be set to the required angular position by means of a widespaced scale.

Dressing Attachment:

The dressing attachment is permanently mounted on the worktable for rapid wheel dressing.

Wet Grinding:

The baffled coolant tank is easily removed from the machine base for cleaning. Coolant is delivered by an industrial type flood pump. Coolant flow is regulated by a valve.

Electric System:

Individual grinding spindle motor, work spindle motor and coolant pump motor all controlled by switches grouped in a control box for ease of operation.

Order Information

Item	Description	Part No.
	VKS16 Valve Grinding Machine	
1.1	400V±10%, 3 phase, 50/60 cycles	235 00 380
1.2	230V±10%, 3 phase, 50/60 cycles	235 00 230
	Standard equipment including grinding wheel, dressing diamond, wet grinding attachment and service tools.	
	Option:	
2.	Work Light including low voltage halogen lamp.	235 90 100
	Accessories:	
3.1	Valve Stem End Grinding Attachment	235 91 100
3.2	Adjustable Valve Stop for fixing the chucking length of the valve stem.	231 40 120
3.3	Cabinet Stand including shelf and lockable door	231 15 100
	Replacement Parts:	
4.1	Grinding Wheel	861 51 260
4.2	Dressing Diamond	861 80 025
4.3	Concentrated Coolant 5 Litre Bottle	838 80 500

Hunger VKM1A

the rigid and robust precision machine for the professional



Specifications:

Wheelhead:

Wheel diameter	175 mm
Wheel speed	2790 rpm
Drive motor	250 W

Workhead:

Work speed	120 rpm
Drive motor	50 W

Wet Grinding:

Coolant capacity	5 Liters
Coolant pump motor	70 W

Dimensions and Weight:

Overall length	650 mm
Overall width	550 mm
Overall height	420 mm
Net weight	approx. 100 kg

Capacity:

Valve stem diameter	3 - 16 mm
Max. valve head diameter	120 mm

Application:

Motorcycles
 Cars and Commercial Vehicles
 Marine and Stationary Diesels



Valve Grinding Machine

Machine Base:

Heavily ribbed cast iron structure for vibration-free performance. Integrated slides for wheelhead infeed and workhead traverse.

Wheelhead:

Box type monobloc noted for its excellent vibration dampening characteristics. The precision motor grinding spindle is permanently sealed and lubricated.

Workhead:

Single precision chuck for perfect valve alignment throughout the large chucking range. No collets! The workhead is located on a swivel plate which can be set to the required angular position by means of a wide-spaced scale.

Dressing Attachment:

The dressing attachment is permanently mounted on the worktable for rapid wheel dressing.

Wet Grinding:

The baffled coolant tank is easily removed from the machine base for cleaning. Coolant is delivered by an industrial type flood pump. Coolant flow is regulated by a valve.

Electric System:

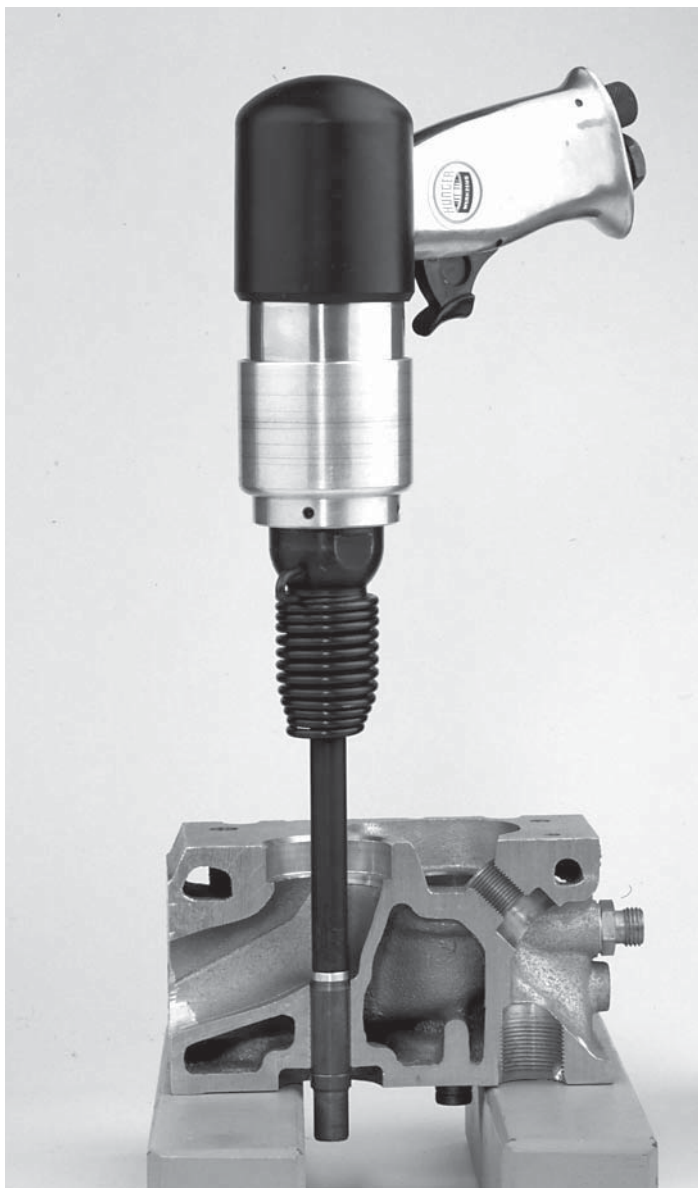
Individual grinding spindle motor, work spindle motor and coolant pump motor all controlled by switches grouped in front of the wheelhead for ease of operation.

Item	Description	Part No.
	VKM1A Valve Grinding Machine	
1.1	400V±10% 3 phase 50/60 cycles	231 00 001
1.2	230V±10% 3 phase 50/60 cycles	231 00 002
	Standard equipment including grinding wheel, dressing diamond, wet grinding attachment and service tools.	
	Options:	
2.1	Speed Control for infinitely adjusting the workspindle speed in the range from 10 to 170 rpm.	231 40 200
2.2	Work Light including low voltage halogen lamp.	231 90 100
2.3	24 V Control Voltage including transformer, contactors, push-buttons and emergency stop.	231 60 100
	Accessories:	
3.1	Valve Stem End Grinding Attachment	231 91 100
3.2	Rocker Arm Grinding Attachment	231 91 200
3.3	Adjustable Valve Stop for fixing the chucking length of the valve stem.	231 40 120
	Replacement Parts:	
4.1	Grinding Wheel	861 51 260
4.2	Dressing Diamond	861 80 025
4.3	Concentrated Coolant 5 Litre bottle	838 80 500

Removing valve guides from cylinder head

Installing new valve guides in cylinder head

Removing seat ring inserts from cylinder head



The PVM 1 is designed to remove and install valve guides in just a few minutes.

The PVM 1 is recommended for motorcycle and automotive repair shops.

Operation is as easy as one two three.

With the proper valve guide driver fitted in air hammer, insert driver into valve guide.

Switch on air supply by the mere actuation of supply valve lever.

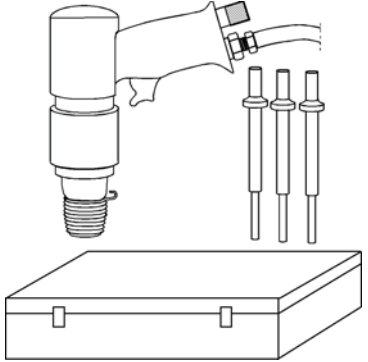


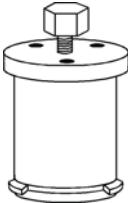

The valve guide is removed or installed with ease by the rapid series of air hammer strokes

A soft expendable washer placed onto the driver protects the valve guide from damage

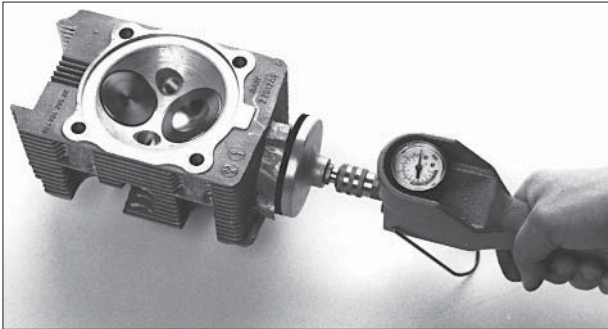
The PVM 1 can be also used for removing valve seat rings.

First a groove is cut into the valve seat ring with a Hunger Valve Seat Refacer.

Then the expanding jaws of an adapter are forced into the groove. Thereafter the seat ring is driven out of the cylinder head by applying strokes of the air hammer to the adapter.

Item Description	Article No.	Picture																													
<p>1. PVM1 Tool Kit for removing and installing valve guides. Contents: Air hammer 3 pcs drivers with nominal diam. 7, 8 & 9 mm, 5pcs each washers for drivers with nominal diam. 7, 8 & 9 mm and storage case.</p>	250 10 500																														
<p>2. Drivers for removing and installing valve guide bushes</p> <p>Nominal diam: for valve guide diam.:</p> <table border="0"> <tr><td>5 mm</td><td>4,9 - 5,4 mm</td><td>250 20 050</td></tr> <tr><td>5,5 mm</td><td>5,4 - 5,9 mm</td><td>250 20 055</td></tr> <tr><td>6 mm</td><td>5,9 - 6,4 mm</td><td>250 20 060</td></tr> <tr><td>6,5 mm</td><td>6,4 - 6,9 mm</td><td>250 20 065</td></tr> <tr><td>7 mm</td><td>6,9 - 7,9 mm</td><td>250 20 070</td></tr> <tr><td>8 mm</td><td>7,9 - 8,9 mm</td><td>250 20 080</td></tr> <tr><td>9 mm</td><td>8,9 - 9,9 mm</td><td>250 20 090</td></tr> <tr><td>10 mm</td><td>9,9 - 10,9 mm</td><td>250 20 100</td></tr> <tr><td>11 mm</td><td>10,9 - 11,9 mm</td><td>250 20 110</td></tr> <tr><td>12 mm</td><td>11,9 - 12,9 mm</td><td>250 20 120</td></tr> </table>	5 mm	4,9 - 5,4 mm	250 20 050	5,5 mm	5,4 - 5,9 mm	250 20 055	6 mm	5,9 - 6,4 mm	250 20 060	6,5 mm	6,4 - 6,9 mm	250 20 065	7 mm	6,9 - 7,9 mm	250 20 070	8 mm	7,9 - 8,9 mm	250 20 080	9 mm	8,9 - 9,9 mm	250 20 090	10 mm	9,9 - 10,9 mm	250 20 100	11 mm	10,9 - 11,9 mm	250 20 110	12 mm	11,9 - 12,9 mm	250 20 120	
5 mm	4,9 - 5,4 mm	250 20 050																													
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12 mm	11,9 - 12,9 mm	250 20 120																													
<p>3. Expendable Washers for the drivers to protect the valve guide bushings. (5 pieces each) for driver with nominal diam.:</p> <table border="0"> <tr><td>5 mm</td><td>250 22 050</td></tr> <tr><td>5,5 mm</td><td>250 22 055</td></tr> <tr><td>6 mm</td><td>250 22 060</td></tr> <tr><td>6,5 mm</td><td>250 22 065</td></tr> <tr><td>7 mm</td><td>250 22 070</td></tr> <tr><td>8 mm</td><td>250 22 080</td></tr> <tr><td>9 mm</td><td>250 22 090</td></tr> <tr><td>10 mm</td><td>250 22 100</td></tr> <tr><td>11 mm</td><td>250 22 110</td></tr> <tr><td>12 mm</td><td>250 22 120</td></tr> </table>	5 mm	250 22 050	5,5 mm	250 22 055	6 mm	250 22 060	6,5 mm	250 22 065	7 mm	250 22 070	8 mm	250 22 080	9 mm	250 22 090	10 mm	250 22 100	11 mm	250 22 110	12 mm	250 22 120											
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5,5 mm	250 22 055																														
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9 mm	250 22 090																														
10 mm	250 22 100																														
11 mm	250 22 110																														
12 mm	250 22 120																														
<p>4. Expanding Adapters for removing valve seat rings</p> <table border="0"> <tr><td>Expanding adapter A for ring diam. 25 - 35 mm</td><td>250 15 250</td></tr> <tr><td>Expanding adapter IJB for ring diam 35 - 45 mm</td><td>250 15 350</td></tr> </table>	Expanding adapter A for ring diam. 25 - 35 mm	250 15 250	Expanding adapter IJB for ring diam 35 - 45 mm	250 15 350																											
Expanding adapter A for ring diam. 25 - 35 mm	250 15 250																														
Expanding adapter IJB for ring diam 35 - 45 mm	250 15 350																														
<p>5. Drivers for Expanding Adapters</p> <table border="0"> <tr><td>Driver 11,8 mm diam.</td><td>250 15 118</td></tr> <tr><td>Driver 12,8 mm diam.</td><td>250 15 128</td></tr> <tr><td>Driver 13,8 mm diam.</td><td>250 15 138</td></tr> </table>	Driver 11,8 mm diam.	250 15 118	Driver 12,8 mm diam.	250 15 128	Driver 13,8 mm diam.	250 15 138																									
Driver 11,8 mm diam.	250 15 118																														
Driver 12,8 mm diam.	250 15 128																														
Driver 13,8 mm diam.	250 15 138																														

Checking the valves for leakage



Operation:

Connect vacuum tester to an air pressure of about 6 bar and use suitable adapter plate to connect the suction inlet of the tester to the respective valve port. Actuate air pressure supply switch and observe the reading of the vacuum gauge. If the reading is in the green range, there is no leak in the entire valve train (valve, seat, stem and guide).

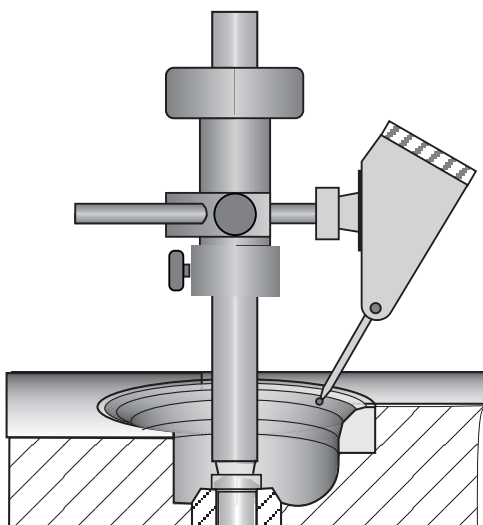
Application:

Motorcycles
Cars
Commercial vehicles

Order Information:

Description	Part No.
DP1 Vacuum Test Kit consisting of vacuum tester, seven different adapter plates, hose and storage case.	865 50 100

Checking the eccentricity of valve seats



Operation:

Place the valve seat indicator on the pilot locked in the valve guide. Adjust indicator so that the measuring lever contacts the seat. When rotating the indicator slowly around the pilot, the eccentricity of the valve seat may be observed at the dial.

Application:

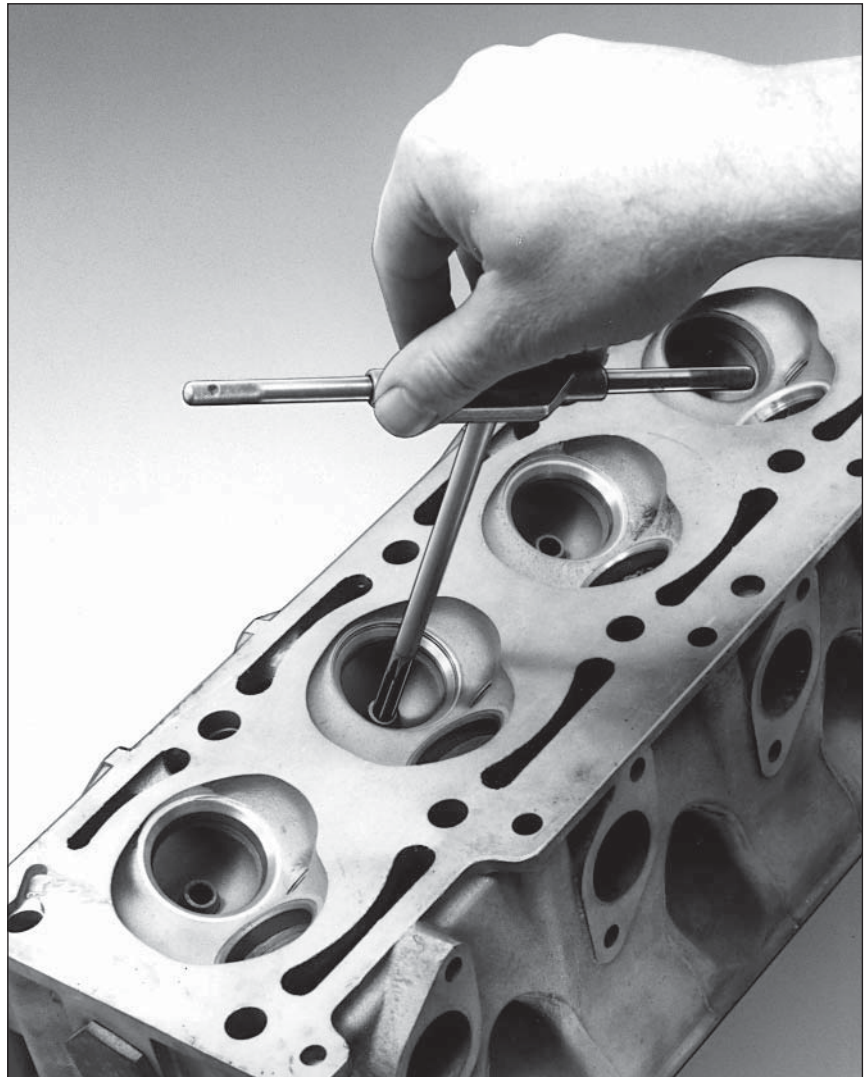
Motorcycles
Cars
Commercial vehicles

Order Information:

Description	Part No.
VP1 Valve Seat Indicator consisting of indicator head, dial gauge with spare lever clamping ring, adapter sleeve and wooden storage case.	217 93 601

Type
V

Type
VR



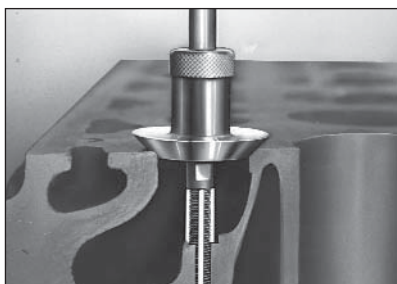
Hunger Reamer Types V and VR

for reaming valve guides

Type V adjustable

Type VR solid

Optional
Seat Bushings



Application:

Motorcycles

Cars

Trucks and other commercial vehicles

Recommended

by leading engine manufacturers

Right hand cutting reamers with adjustable blades and extra long shanks.
 Specially precision ground cutting edges with gradually increasing clearance angle eliminate chattering and permit easy and smooth chip formation.
 The reamers are also available with hard chromium coated blades (Series HC) to further improve the cutting performance.
 An optional seat bushing is available for each reamer size. The seat bushing centers firmly in the valve seat so that the reamer aligns perfectly with the bore.



Reamers						Seat Bushing	
Type	Range mm	Overall Length mm	Length of Cutting Edge mm	Number of Blades	Weight kg	Conicity mm	Weight kg
V 5,9	5,9 - 6,5	160	28	3	0,030	17 - 28	0,050
V 6,4	6,4 - 7	160	28	3	0,035	17 - 28	0,050
V 6,9	6,9 - 7,5	160	28	3	0,040	21 - 38	0,070
V 7,4	7,4 - 8	165	28	3	0,045	21 - 38	0,065
V 7,9	7,9 - 8,5	170	28	3	0,055	23 - 47	0,150
V 8,4	8,4 - 9	175	28	3	0,065	23 - 47	0,155
V 8,9	8,9 - 9,5	180	32	4	0,075	25 - 53	0,190
V 9,4	9,4 - 10	190	32	4	0,085	25 - 53	0,180
V 9,9	9,9 - 11	200	36	5	0,100	25 - 53	0,190
V10,9	10,9 - 12	220	36	5	0,130	33 - 60	0,270

Order Information

Type	Reamer		Seat Bushing Part No.	Spare Blades		Spare Nut Part No.
	Standard Part No.	HC Part No.		Standard Set No.	HC Set No.	
V 5,9	140 02 000	141 02 000	140 02 600	140 02 400	141 02 400	140 02 510
V 6,4	140 03 000	141 03 000	140 03 600	140 03 400	141 03 400	140 03 510
V 6,9	140 04 000	141 04 000	140 04 600	140 04 400	141 04 400	140 04 510
V 7,4	140 05 000	141 05 000	140 05 600	140 05 400	141 05 400	140 05 510
V 7,9	140 06 000	141 06 000	140 06 600	140 06 400	141 06 400	100 08 510
V 8,4	140 07 000	141 07 000	140 07 600	140 07 400	141 07 400	140 07 510
V 8,9	140 08 000	141 08 000	140 08 600	140 08 400	141 08 400	140 08 510
V 9,4	140 09 000	141 09 000	140 09 600	140 09 400	141 09 400	140 09 510
V 9,9	140 10 000	141 10 000	140 10 600	140 10 400	141 10 400	140 10 510
V10,9	140 11 000	141 11 000	140 11 600	140 11 400	141 11 400	140 11 510

Sets of Reamers Type V in Wooden Storage Case

Reamer Set		Range mm	Number		Weight kg
Standard Part No.	HC Part No.		Reamers	Seat Bushings	
140 00 100	141 00 100	5,9 - 12	10	-	1,140
140 00 200	141 00 200	5,9 - 12	10	10	3,500



Right hand cutting solid reamers with extra long shanks.

The front end of these reamers is ground to act as pilot. The cutting edges are precision ground with a gradually increasing clearance angle to eliminate chattering and to permit easy and smooth chip formation.

The reamers are provided with a hard chromium coating. The very hard chromium coating reduces friction, giving improved chip flow and reducing the tendency for built-up edges. TiN coating is available on request.

Standard Sizes:



Size Ø mm	Part No.
4	172 04 000
4,5	172 05 003
5	172 05 000
5,49	172 06 016
5,5	172 06 002
5,51	172 06 015
5,99	172 06 020
6	172 06 000
6,6	172 07 022
6,61	172 07 043
6,99	172 07 038
7	172 07 000
7,075	172 07 006
7,15	172 07 007
7,30	172 07 008

Size Ø mm	Part No.
7,99	172 08 0300
8	172 08 000
8,73	172 09 020
8,99	172 00 004
9	172 09 000
9,075	172 09 006
9,15	172 09 011
9,30	172 09 022
9,53	172 10 017
9,99	172 10 002
10	172 10 000
10,99	172 11 001
11	172 11 000
11,99	172 12 001
12	172 12 000

These reamers are designed to provide a hole tolerance of H7.

Special Sizes:

Reamers for special valve guides will be furnished within a short time. State valve guide diameter when ordering.

Dimensions of Valve Guide Reamers Type VR

Overall length 234 mm
Length of cutting portion 70 mm

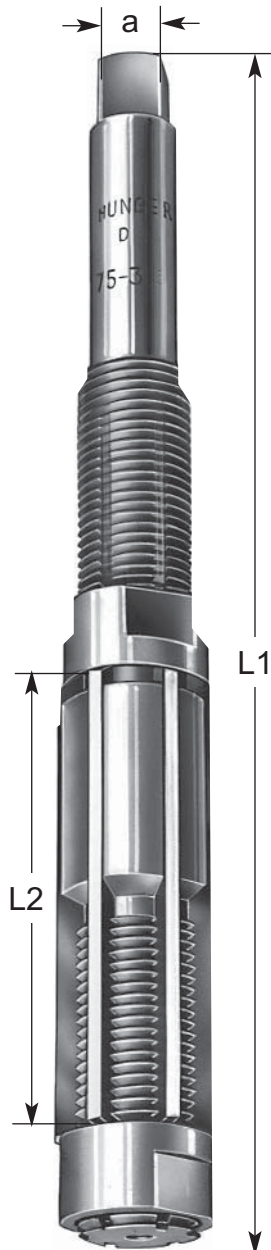
Type D

Description:

Righthand cutting reamer with expanding blades.
Due to the unique Hunger relief grinding operation the blades have a progressively increasing clearance angle giving a softer cutting action.
Starting with size D 12 the adjusting nut is marked with a circular scale.
One graduation of the scale corresponds to an alteration of the reamer diameter by 0,01 mm.

Application:

The standard reamer for repair and assembly jobs.



Size	Size Range		Length Overall L1 mm	Length Blades L2 mm	Size of Square a mm	No. of Blades	Weight kg
	mm	Inches					
D 6,4	6,4 - 7,2	1/4 - 9/32	111	32	3	4	0,015
D 7,2	7,2 - 8	9/32 - 5/16	111	32	3,5	4	0,015
D 8	8 - 9	5/16 - 23/64	111	32	4,3	5	0,025
D 9	9 - 10	23/64 - 25/64	115	32	4,3	5	0,035
D 10	10 - 11	25/64 - 7/16	120	35	4,9	5	0,040
D 11	11 - 12	7/16 - 15/32	125	35	6,2	5	0,045
D 12	12 - 13,5	15/32 - 17/32	130	42	6,2	5	0,075
D 13,5	13,5 - 15,5	17/32 - 39/64	145	50	7	5	0,100
D 15,5	15,5 - 18	39/64 - 45/64	165	60	8	5	0,155
D 18	18 - 21	45/64 - 53/64	180	65	9	5	0,225
D 21	21 - 24	53/64 - 15/16	190	70	10	5	0,320
D 24	24 - 27,5	15/16 - 1 5/64	205	75	11	5	0,430
D 27,5	27,5 - 31,5	1 5/64 - 1 15/64	225	80	12	6	0,600
D 31,5	31,5 - 37	1 15/64 - 1 29/64	240	90	14,5	6	0,870
D 37	37 - 45	1 29/64 - 1 49/64	285	100	16	6	1,410
D 45	45 - 55	1 49/64 - 2 5/32	320	109	20	6	2,320
D 55	55 - 65	2 5/32 - 2 9/16	350	120	24	8	3,830
D 65	65 - 80	2 9/16 - 3 5/32	460	145	29	10	6,800
D 80	80 - 95	3 5/32 - 3 47/64	490	150	32	10	10,250
D 95	95 - 110	3 47/64 - 4 21/64	490	150	36	10	13,700

Packing of the reamers:

From size D 6,4 to D 45 individually in clear plastic tube containers.

Size D 55 in a plastic net.

From size D 65 to D 95 individually in wooden boxes.

Sets of Reamers Type D in Wooden Cases

Symbol	Size Range		No. of Reamers	Weight kg
	mm	Inches		
DAN	8 - 31,5	21/64 - 1 15/64	11	3,100
DEN	8 - 45	21/64 - 1 49/64	13	5,700

Description:

Righth-hand cutting reamer with expanding blades.

Extra long blades!

The blades are approximately 2/3 longer than the blades of reamer type D.

Due to the unique Hunger relief grinding operation the blades have a progressively increasing clearance angle giving a softer cutting action.

Application:

The reamer for reaming longer holes and adjacent inline holes.



Size	Size Range		Length Overall L1 mm	Length Blades L2 mm	Size of Square a mm	No. of Blades	Weight kg
	mm	Inche					
E 10,5	10,5 - 12	27/64 - 15/32	160	65	5,5	5	0,070
E 12	12 - 13,5	15/32 - 17/32	170	70	6,2	5	0,100
E 13,5	13,5 - 15,5	17/32 - 39/64	195	80	7	5	0,140
E 15,5	15,5 - 17,5	39/64 - 11/16	215	90	8	5	0,210
E 17,5	17,5 - 19,5	11/16 - 49/64	230	100	9	5	0,280
E 19,5	19,5 - 21,5	49/64 - 27/32	240	110	10	5	0,370
E 21,5	21,5 - 24,5	27/32 - 31/32	260	120	10	5	0,470
E 24,5	24,5 - 27,5	31/32 - 1 5/64	280	130	11	5	0,640
E 27,5	27,5 - 31,5	1 5/64 - 1 15/64	310	140	12	6	0,880
E 31,5	31,5 - 37	1 15/64 - 1 29/64	320	150	14,5	6	1,240
E 37	37 - 45	1 29/64 - 1 49/64	370	165	16	6	1,970
E 45	45 - 55	1 49/64 - 2 5/32	425	180	20	6	3,240

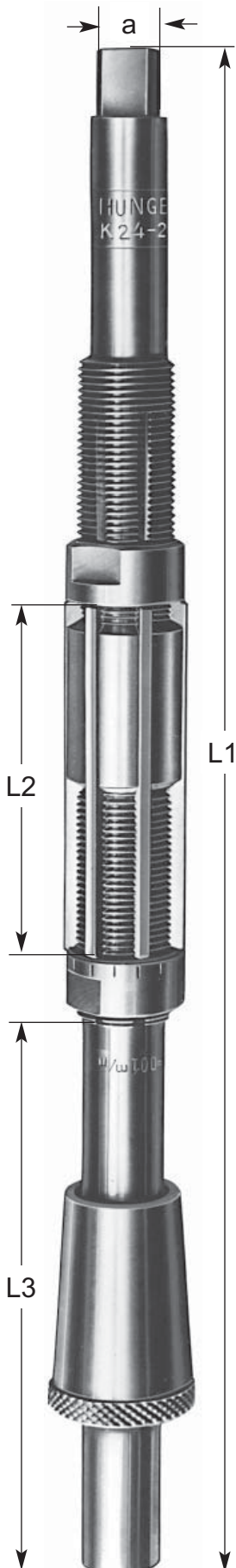
Packing of the reamers:

Individually in clear plastic tube containers.

Sets of Reamers Type E in Wooden Cases

Symbol	Size Range		No. of Reamers	Weight kg
	mm	Inches		
EA	10,5 - 31,5	27/64 - 1 15/64	9	3,100
ESO	10,5 - 45	27/64 - 1 49/64	11	5,700

Type K



Description:

Righthand cutting reamer with expanding blades.
Parallel shank with square at the back and integral pilot with sliding cone bush at the front of the reamer.
Due to the unique Hunger relief grinding operation the blades have a progressively increasing clearance angle giving a softer cutting action.
Starting with size K 12 the adjusting nut is marked with a circular scale.
One graduation of the scale corresponds to an alteration of the reamer diameter by 0,01 mm.

Application:

The precision reamer for inline reaming of holes.
The cone bush holds the reamer in exact alignment when reaming two holes.

Size	Size Range		Length Overall L1 mm	Length Blades L2 mm	Length Pilot L3 mm	Size of Square a mm	No. of Blades	Weight kg
	mm	Inches						
K 7	7 - 8	9/32 - 5/16	175	32	65	3,5	4	0,030
K 8	8 - 9	5/16 - 23/64	175	32	65	4,3	5	0,055
K 9	9 - 10	23/64 - 25/64	175	32	65	4,3	5	0,065
K 10	10 - 11	25/64 - 7/16	185	35	68	4,9	5	0,085
K 11	11 - 12	7/16 - 15/32	195	35	72	6,2	5	0,100
K 12	12 - 13,5	15/32 - 17/32	215	42	84	6,2	5	0,130
K 13,5	13,5 - 15,5	17/32 - 39/64	235	50	89	7	5	0,180
K 15,5	15,5 - 18	39/64 - 45/64	265	60	98	8	5	0,280
K 18	18 - 21	45/64 - 53/64	290	65	109	9	5	0,410
K 21	21 - 24	53/64 - 15/16	310	70	119	10	5	0,570
K 24	24 - 27,5	15/16 - 1 5/64	335	75	129	11	5	0,770
K 27,5	27,5 - 31,5	1 5/64 - 1 15/64	365	80	137	12	6	1,040
K 31,5	31,5 - 37	1 15/64 - 1 29/64	400	90	159	14,5	6	1,550
K 37	37 - 45	1 29/64 - 1 49/64	465	100	180	16	6	2,550
K 45	45 - 55	1 49/64 - 2 5/32	530	109	198	20	6	5,000
K 55	55 - 65	2 5/32 - 2 9/16	570	120	213	24	8	6,450
K 65	65 - 80	2 9/16 - 3 5/32	670	145	250	29	10	11,900
K 80	80 - 95	3 5/32 - 3 47/64	700	150	250	32	10	13,700
K 95	95 - 110	3 47/64 - 4 21/64	700	150	250	36	10	23,900

Packing of the reamers:

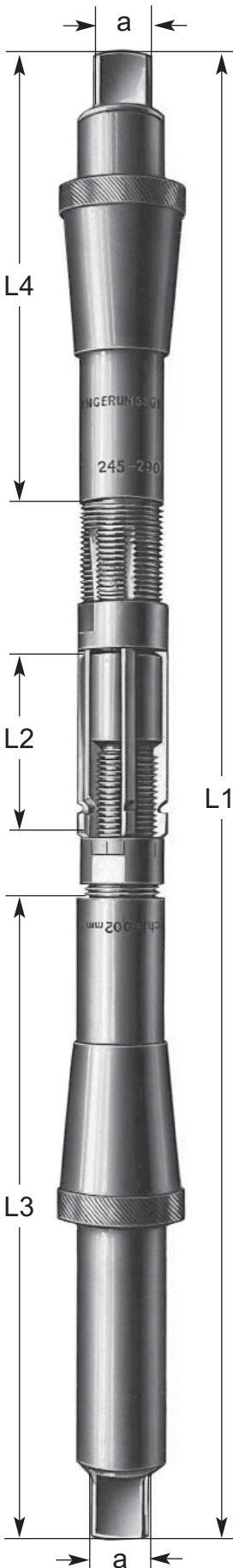
From size K 7 to K 37 individually in clear plastic tube containers.

From size K 45 to K 55 individually in plastic nets.

From size K 65 to K 95 individually in wooden boxes.

Sets of Reamers Type K in Wooden Cases

Symbol	Size Range		No. of Reamers	Weight kg
	mm	Inches		
KAN	8 - 31,5	21/64 - 1 15/64	11	5,200
KEN	8 - 45	21/64 - 1 49/64	13	10,700



Description:

Righthand cutting reamer with expanding blades.
Exchangeable pilots at the front as well as at the back of the reamer.
Each pilot is provided with square and sliding cone bush.
A special bayonet coupling with mating cones between each pilot and the reamer body ensures correct alignment. For extension pilots see page 9.
The blades are ground for taking a rough cut followed by finish reaming.
Due to the unique Hunger relief grinding operation the blades have a progressively increasing clearance angle giving a softer cutting action.
The adjusting nut is marked with a circular scale.
One graduation of the scale corresponds to an alteration of the reamer diameter by 0,02 mm.

Application:

The universal reamer for all types of holes, particularly for inline reaming of two or more holes.
The cone bushes provide for exact alignment between the hole being reamed and the other mating holes.

Size	Size Range mm	Length Overall L1 mm	Length Blades L2 mm	Length Pilot L3 mm	Length Pilot L4 mm	Size of Square a mm	No. of Blades	Weight kg
U 12	12 - 13,5	250	30	110	82	8	5	0,170
U 13,5	13,5 - 15,5	270	33	116	84	9	5	0,245
U 15,5	15,5 - 18	295	36	127	88	10	5	0,360
U 18	18 - 21	330	40	140	100	12	5	0,545
U 19,5	19,5 - 22,5	352	44	150	110	13	5	0,700
U 21	21 - 24,5	352	44	150	110	13	5	0,800
U 24,5	24,5 - 29	385	48	157	118	13	6	1,140
U 29	29 - 34	418	52	170	130	16	6	1,670
U 34	34 - 39	440	54	180	140	18	6	2,430
U 39	39 - 45	475	60	190	150	18	6	3,310
U 45	45 - 52	500	60	200	162	18	6	4,700
U 52	52 - 59	500	60	200	162	18	6	5,700
U 59	59 - 66	500	60	200	162	18	6	6,700

Packing of the reamers:

From Size U 12 to U 39 individually in clear plastic tube containers.
From Size U 45 to U 59 individually in plastic nets.

Sets of Reamers Type U in Wooden Cases

Symbol	Size Range		No. of Reamers	Weight kg
	mm	Inches		
USI	12 - 34	15/32 - 1 11/32	7	6,700
USE	12 - 45	15/32 - 1 49/64	9	13,100

Type U Pilots

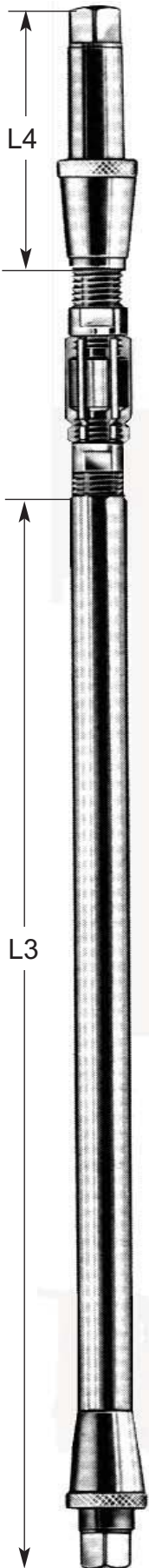
Design:

Each pilot has a square at the one end and a female cone at the other end. The female cone in the pilot is designed to receive the mating male cone at the reamer body.

Pilot and reamer body are interlocked by a bayonet type coupling.

As the mating cones usually stick firmly together, the use of a plastic hammer is recommended to loosen the firm contact before removing the pilot from the reamer body. Apply light taps onto the pilot around the female cone.

With the contact thus loosened, turn the pilot clockwise with respect to the reamer body until the triangular projection provided at the male cone is in the middle of the recess provided in the female cone. Then withdraw pilot from reamer body.



Size of Reamer	Standard Front Pilots		Standard Back Pilots		Extension Pilots Size I	
	Length L3 mm	Part No.	Length L4 mm	Part No.	Length mm	Part No.
U 12	110	130 12 701	82	130 12 702	210	132 12 711
U 13,5	116	130 13 701	84	130 13 702	220	132 13 712
U 15,5	127	130 15 701	88	130 15 702	230	132 15 713
U 18	140	130 18 701	100	130 18 702	240	132 18 714
U 19,5	150	130 19 701	110	130 19 702	250	132 19 715
U 21	150	130 21 701	110	130 21 702	250	132 21 715
U 24,5	157	130 24 701	118	130 24 702	260	132 24 716
U 29	170	130 29 701	130	130 29 702	270	132 29 717
U 34	180	130 34 701	140	130 34 702	280	132 34 718
U 39	190	130 39 701	150	130 39 702	290	132 39 719
U 45	200	130 45 701	162	130 45 702	400	132 45 730
U 52	200	130 52 701	162	130 52 702	400	132 52 730
U 59	200	130 52 701	162	130 59 702	400	132 52 730

Size of Reamer	Extension Pilots Size II		Extension Pilots Size III		Extension Pilots Size IV	
	Length mm	Part No.	Length mm	Part No.	Length mm	Part No.
U 12	410	132 12 731	610	132 12 751	810	132 12 771
U 13,5	420	132 13 732	620	132 13 752	820	132 13 772
U 15,5	430	132 15 733	630	132 15 753	830	132 15 773
U 18	440	132 18 734	640	132 18 754	840	132 18 774
U 19,5	450	132 19 735	650	132 19 755	-	-
U 21	450	132 21 735	650	132 21 755	850	132 21 775
U 24,5	460	132 24 736	660	132 24 756	860	132 24 776
U 29	470	132 29 737	670	132 29 757	870	132 29 777
U 34	480	132 34 738	680	132 34 758	880	132 34 778
U 39	490	132 39 739	690	132 39 759	890	132 39 779
U 45	600	132 45 750	800	132 45 770	900	132 45 780
U 52	600	132 52 750	800	132 52 770	900	132 52 780
U 59	600	132 52 750	800	132 59 770	900	132 52 780

Special length extension pilots available on request.

Design:

Right-hand cutting shell reamer with expanding blades.

The reamer fits on a tool bar and may be positioned along the tool bar at any desired position.

The reamer is automatically locked in place on the tool bar by an expanding spring coupling as soon as the reamer blades are brought into engagement with the bore.

Expanding tool bar guides and supporting fixtures for the tool bar are available to ensure exact alignment of the tool bar when reaming a series of aligned holes.

The adjusting nut is marked with a circular scale. One graduation of the scale corresponds to an alteration of the reamer diameter by 0,02 mm.

Application:

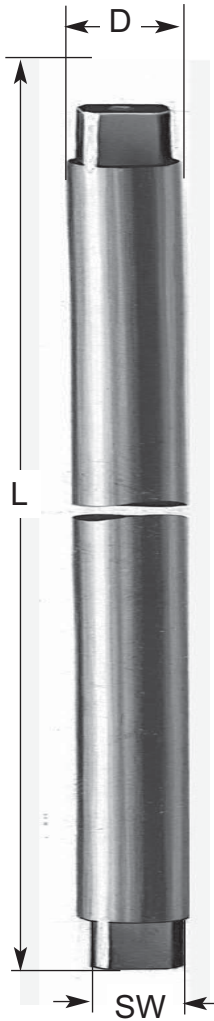
The reamer for inline reaming of a series of holes, particularly the holes of crankshaft and camshaft bearings.



Size	Size Range mm	Takes Tool Bar d mm	Length Overall L1 mm	Length Blades L2 mm	Nut SW mm	No. of Blades	Weight kg
H 36	36 - 38	20	96	44	32	6	0,370
H 38	38 - 41	20	99	44	34	6	0,450
H 41	41 - 44	20	104	48	38	6	0,590
H 44	44 - 47	25	104	48	40	6	0,590
H 47	47 - 51	25	108	48	43	6	0,760
H 51	51 - 54	30	108	52	47	5	0,830
H 54	54 - 58	30	113	52	47	6	0,930
H 58	58 - 62	30	113	52	53	6	1,180
H 62	62 - 65	35	114	52	58	8	1,290
H 65	65 - 69	35	118	57	58	8	1,490
H 69	69 - 73	40	118	57	64	8	1,790
H 73	73 - 78	40	123	57	68	8	1,990
H 78	78 - 83	45	124	57	70	8	2,110
H 83	83 - 88	45	124	60	78	8	2,750
H 88	88 - 93	50	124	60	83	8	3,000
H 93	93 - 99	50	127	60	83	10	3,490
H 99	99 - 105	50	127	60	*	10	4,200
H 105	105 - 111	50	127	60	*	10	5,040

Reamers type H with size range over 111 mm on application.

* Adjustment of the nut with hook wrench.



Tool Bars for Reamers Type H

Description:

Precision ground bars with squares at both ends.
Standard types are listed below.
Special length guide bars on application.

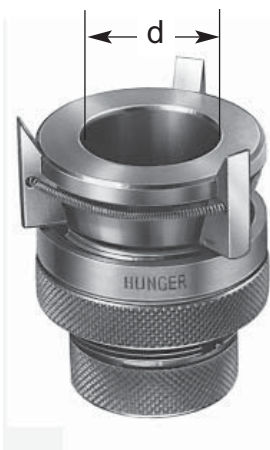
Order Information:

Tool Bar		Diameter D mm	Length L mm	Square SW mm	Weight kg
Part No.	for Reamer Size				
152 20 101	H 36 - H 41	20	1000	13	2,420
152 25 101	H 44 - H 47	25	1000	13	3,740
152 30 121	H 51 - H 58	30	1200	16	6,540
152 30 151	H 51 - H 58	30	1500	16	12,000
152 35 121	H 62 - H 65	35	1200	18	8,750
152 40 151	H 69 - H 73	40	1500	18	14,400
152 45 151	H 78 - H 83	45	1500	22	18,110
152 50 171	H 88 - H 105	50	1700	22	25,200

Expanding Tool Bar Guides

Description:

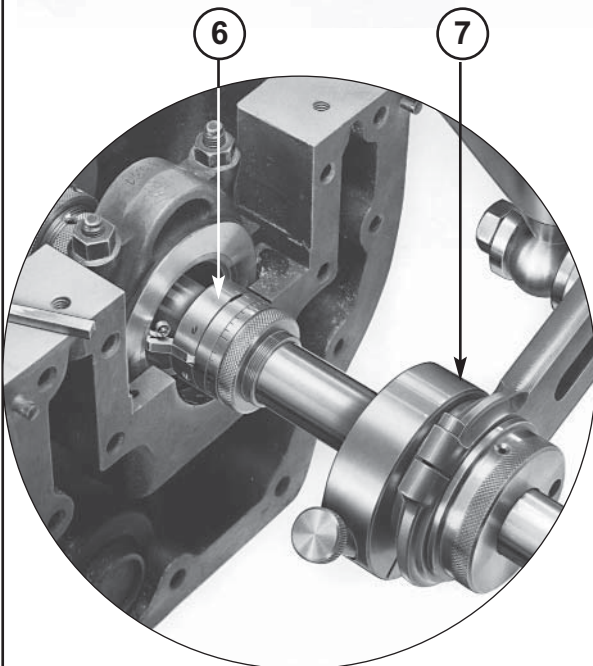
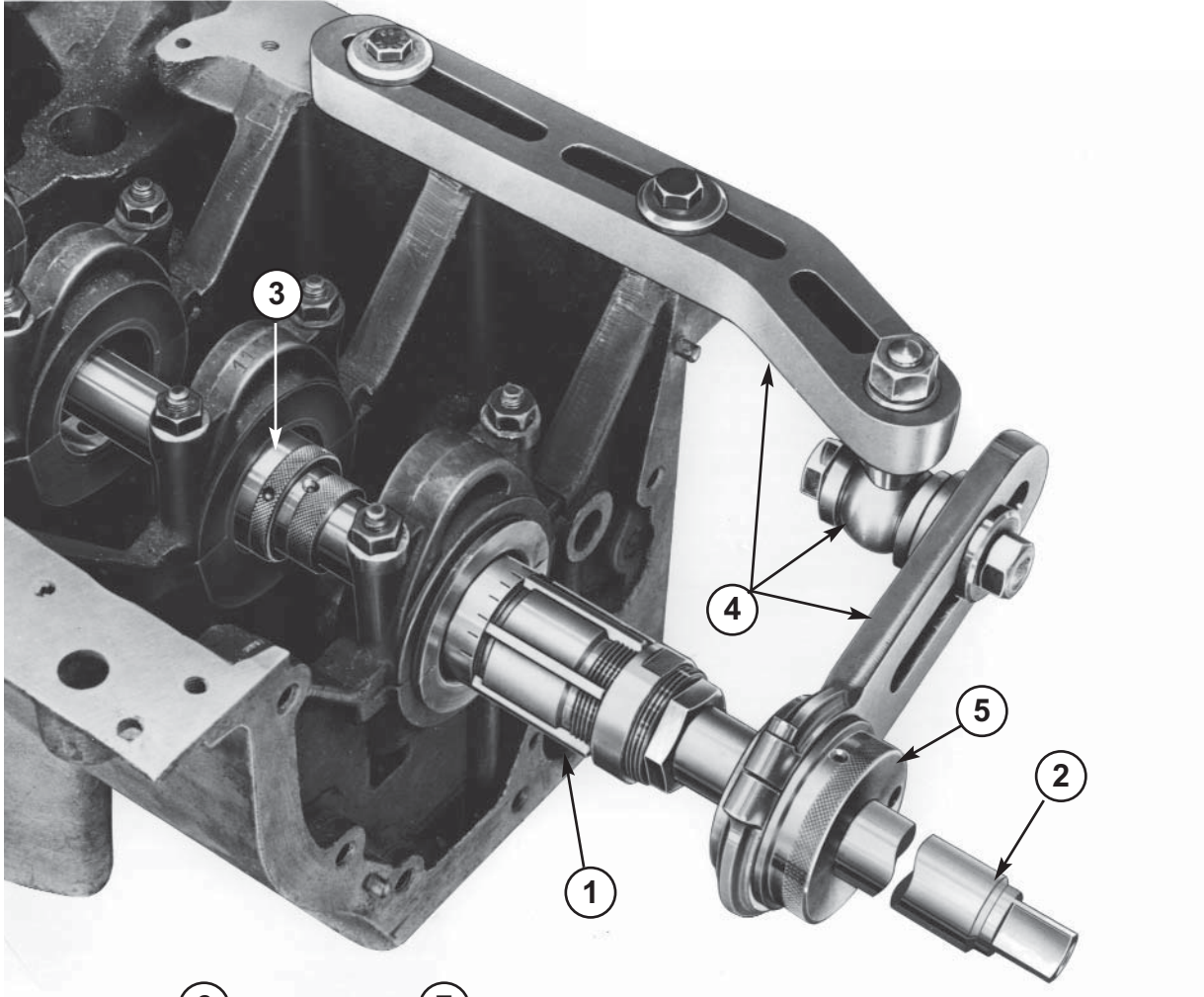
The tool bar guides are provided with wedges which can be forced outward against the hole to lock the tool bar guide in the hole.
The wedges are actuated by an adjusting nut.



Order Information:

Tool Bar Guides		Bore d mm	Expansion Range mm	Weight kg
Part No.	for Reamer Size			
153 20 000	H 36 - H 41	20	35,5 - 54	0,200
153 25 000	H 44 - H 47	25	43,5 - 62	0,300
153 30 000	H 51 - H 58	30	49,5 - 74	0,410
153 35 000	H 62 - H 65	35	61,5 - 83	0,620
153 40 000	H 69 - H 73	40	68,5 - 93	0,800
153 45 000	H 78 - H 83	45	77,5 - 105	1,100
153 50 000	H 88 - H 105	50	87,5 - 127	1,550

**Machining of bearing tunnels
from 36 to 110mm diameter**



The individual parts:

- ① Expanding reamer type H
- ② Tool bar
- ③ Expanding tool bar guide
- ④ Supporting fixture
- ⑤ Guide bush
- ⑥ Boring head
- ⑦ Feed unit

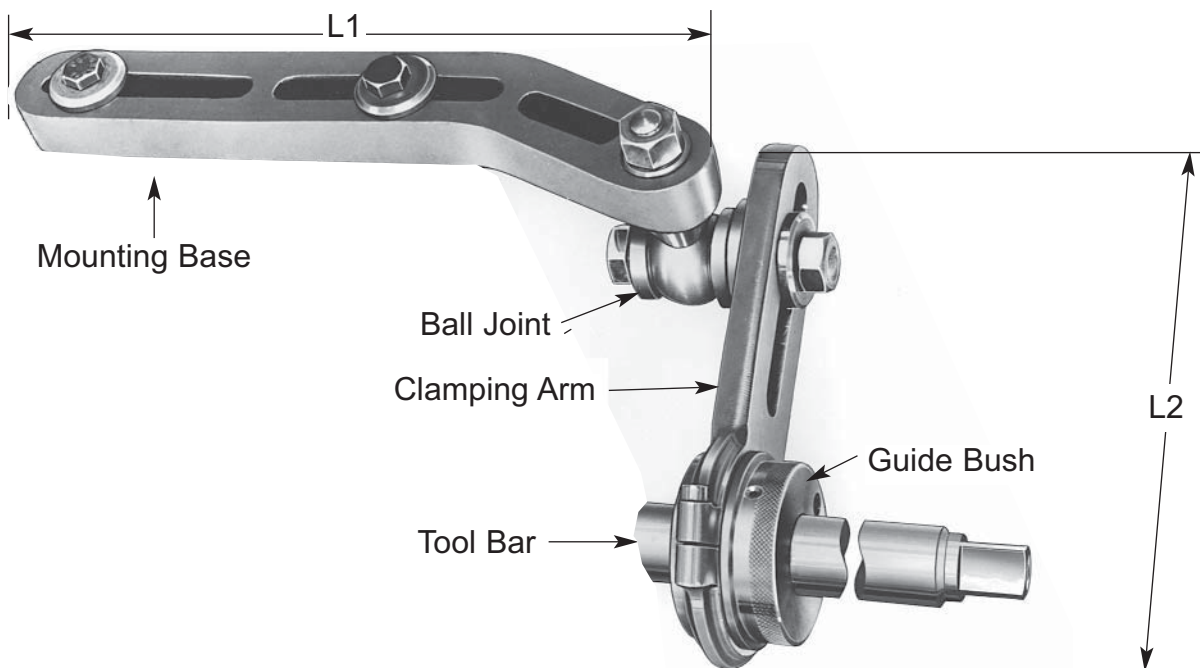
Supporting Fixture for Tool Bars

Description:

The universal supporting fixture is designed to locate a tool bar guide bush in front of an end bearing hole for perfect alignment of the tool bar in centerline with the hole.

The guide bush is locked in a clamping arm which is connected by a ball joint to a mounting base which is attached to the cylinder block or cylinder head.

Both the clamping arm and the ball joint are adjustable to ensure proper alignment.



Order Information:

Size	Supportin Fixture		Individual Components of the Supporting Fixture						
	Part No.	Weight kg	Mounting Base			Clamping Arm		Ball Joint	
			Size	Part No.	L1 mm	Size	Part No.	L2 mm	Part No.
IA	156 11 100	3,140	IA	156 11 110	330	IA	156 11 120	210	156 11 130
IIA	156 12 100	5,100	IIA	156 12 110	400	IIA	156 12 120	270	156 11 130
IIA1	156 12 102	5,100	IIA	156 12 110	400	IA	156 11 120	210	156 11 130

Size	Part No.	Bore Dia. for Bar	Weight kg
IA/20	156 21 200	20 mm	0,920
IA/25	156 21 250	25 mm	0,880
IA/30	156 21 300	30 mm	0,820
IA/35	156 21 350	35 mm	0,750
IA/40	156 21 400	40 mm	0,650
IA/45	156 21 450	45 mm	0,600
IA/50	156 21 500	50 mm	0,550

Size	Part No.	Bore Dia. for Bar	Weight kg
IIA/40	156 22 400	40 mm	1,940
IIA/45	156 22 450	45 mm	1,890
IIA/50	156 22 500	50 mm	1,800



Boring Heads

Description:

Then boring heads are designed to counterbore the hole before finish reaming

The boring heads are fitted with an adjustable single point cutting tool..

A set screw is provided to adjust the cutting tool.



Boring head Part No.	Dimensions		Weight kg
	Diameter of hole for tool bar d mm	Range of adjusting tool bar D mm	
154 30 000	30	50 - 58	0,340
154 31 000	30	53 - 62	0,420
154 35 000	35	61 - 69	0,520
154 40 000	40	68 - 78	0,660
154 45 000	45	77 - 88	0,870
154 50 000	50	87 - 99	1,230
154 52 000	50	92 - 105	1,440
154 54 000	50	98 - 111	1,670

Boring heads and tool bars for 20 & 25 mm on request.

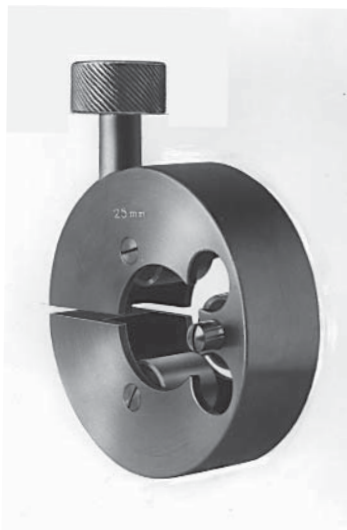
Feed Devices

Description:

The feed devices provide automated feed of the tool bar in axial direction when the tool bar is rotated.

The feed device must be located just behind the guide bush.

A knurled screw is provided for engaging and disengaging the automated feed.



Feed device Part No.	Diameter of hole for tool bar mm	Weight kg
155 20 000	20	0,330
155 25 000	25	0,360
155 30 000	30	0,730
155 35 000	35	0,760
155 40 000	40	0,830
155 45 000	45	0,840
155 50 000	50	0,850