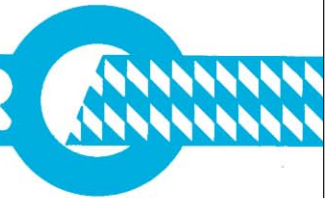


**HUNGER**



**Catalog A24.1 'Automotive'**

**Tools and Equipment  
for Engine Repair**

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# 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 seat refacing systems, which have been developed and refined into today's high performance equipment.

The qualities of **HUNGER** equipment are the result of working very closely with leading engine manufacturers and the research and experience **HUNGER** has gained from over 100 years of precision equipment manufacturing.

**HUNGER** equipment has been tested and approved by leading engine manufacturers and is used worldwide for high performance work.

Today's demanding tolerances and finishes require the **HUNGER** equipment.

You can count 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

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## 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.

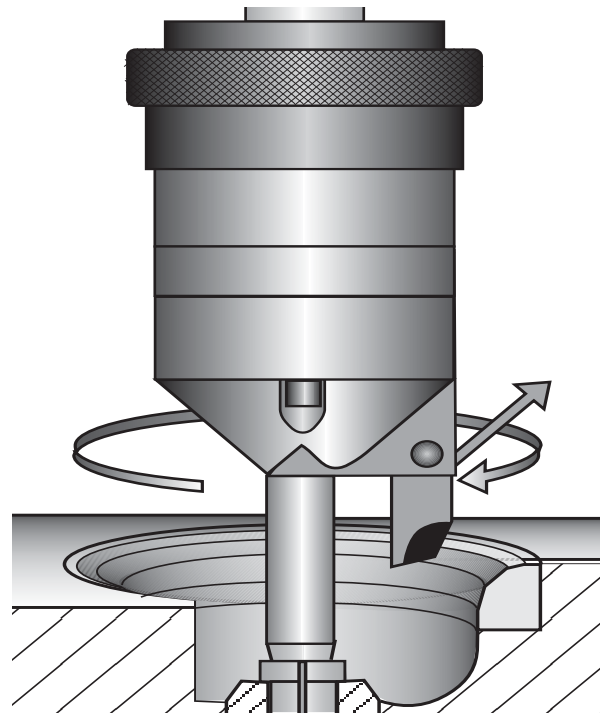
No setting gauges, no time consuming measurements or guesswork when mounting the cutter and setting up the VD on pilot.

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.

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



**Capacity:**

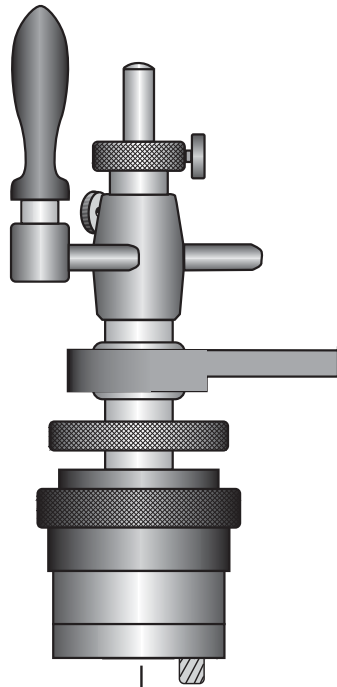
Valve seat diameter range 14 - 60mm  
Valve seat angles 45°, 35°, 30°,  
25°, 20°, 15° & 0°

**Application:**

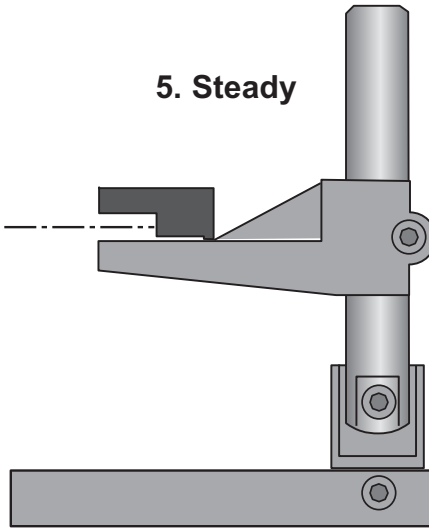
Motorcycles  
Cars  
Light commercial vehicles

Item. Description	Part No.
<b>1. VDS1A Basic Unit</b>	234 11 002
The gear head of the basic unit is designed to receive an adapter head for the respective seat angle.	
<b>2. Adapter Heads</b>	
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
<b>Complete Refacing Units:</b>	
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
<b>3. Pilots</b>	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.	
<b>4. Cutters</b>	
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
<b>5. Steady</b> (page 26)	216 55 500
The steady stabilizes the refacing unit just below the crank handle.	
<b>6. Service Tools</b>	
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
<b>7. Storage cases</b>	
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

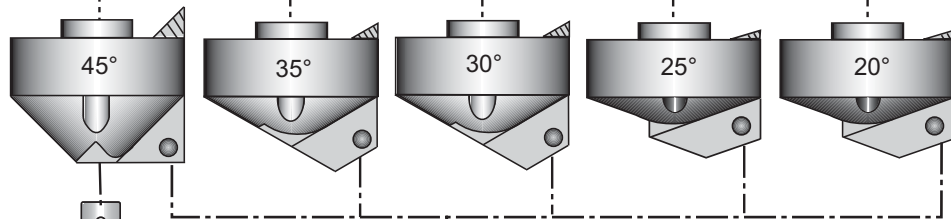
1. Basic Tool



5. Steady



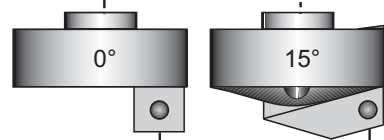
2. Adapter Heads



3. Pilots



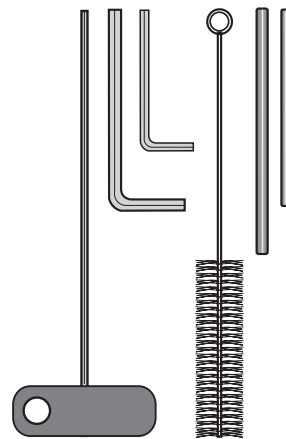
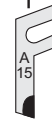
4.1 Cutters



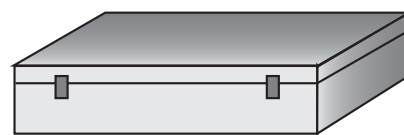
4.3 Cutters



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**

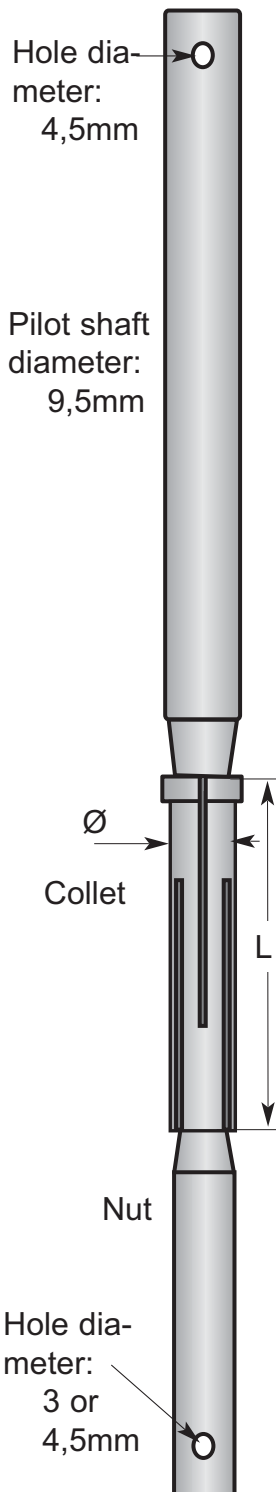
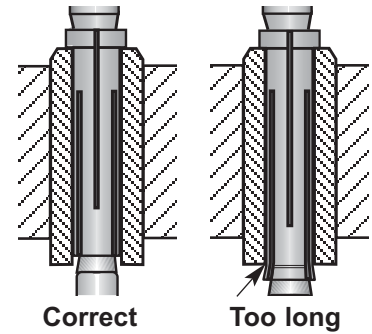
Expanding pilots are available to fit valve guides from 5,9 to 12,9 mm in diameter.

Two or more collets are available for each pilot size.

Collets of different length L are available for most 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 71 106	216 71 506
5,9 - 6,2	35	6/1	216 71 102	216 71 502
6,2 - 6,5	35	↓	216 71 103	216 71 503
6,4 - 6,65	35	↓	216 71 104	216 71 504
6,65 - 6,9	35	↓	216 71 105	216 71 505
6,9 - 7,2	35	7/1	216 75 112	216 75 512
7,2 - 7,5	35	↓	216 75 113	216 75 513
↓	42	↓	216 71 113	216 71 513
7,4 - 7,65	35	↓	216 75 114	216 75 514
↓	42	↓	216 71 114	216 71 514
7,65 - 7,9	35	↓	216 75 115	216 75 515
↓	↓	↓	↓	↓
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 75 123	216 75 523
↓	52	↓	216 71 123	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 75 133	216 75 533
↓	59	↓	216 71 133	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 75 143	216 75 543
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 75 148	216 75 548
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 75 153	216 75 553
↓	84	↓	216 71 153	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.

Also for unlisted valve guide diameter solid pilots are available, so please specify the exact valve guide diameter when ordering.

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

Special sizes from 4 - 12 mm available on request.

**Tommy Bars**

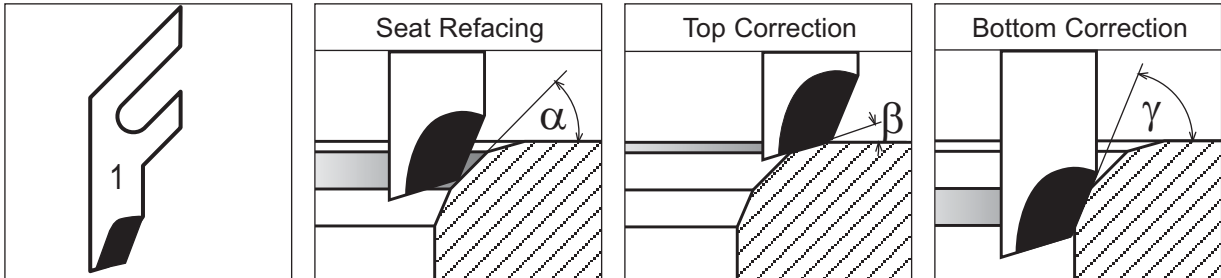
Tommy bars are required for mounting and demounting expanding pilots and for withdrawing solid pilots from the valve guides.



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

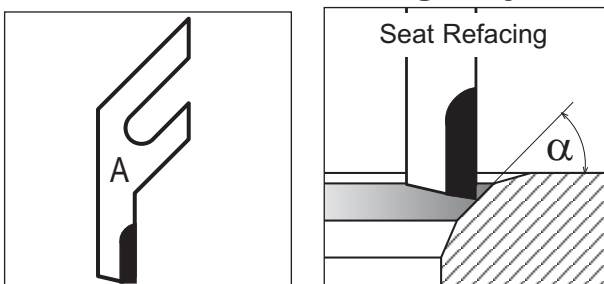
Cutters of different length, width and cutting geometry are available to cut valve seats of different size, shape and location.

### 1. Cutters for seat refacing and correction



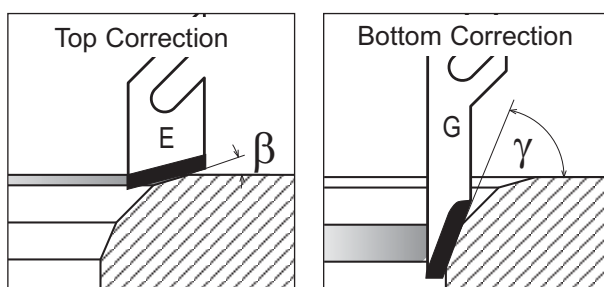
In addition to single point refacing of the valve seat the primary and/or secondary cutting edges of this cutter type are designed for machining the top and/or bottom edges of the valve seat under the proper angle.

### 2. Cutters for seat refacing only



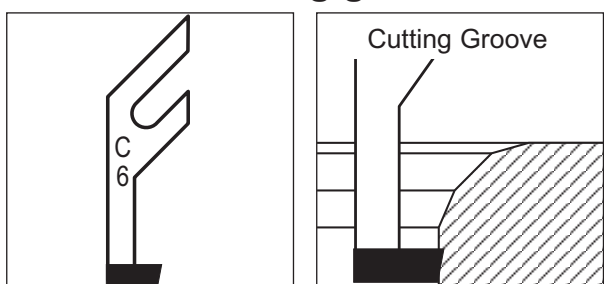
This type is designed for cutting only the valve seat surface. The cutting edge geometry of this cutter type is optimized to cut hard-to-face seat materials properly.

### 3. Cutters for correction only











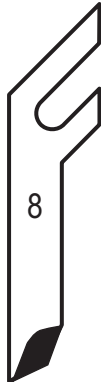
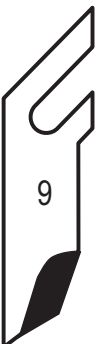

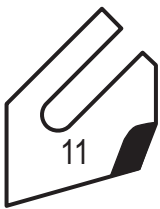
This type of cutter is designed for correction only. The angle of correction is defined by the proper inclination of the cutting edge. Cutters 24, 24M, 30, C4-2, C8-2, E, E2, F, F1, F4, F5, F10, G and H belong to this type of cutters.

### 4. Cutters for cutting grooves

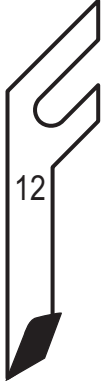
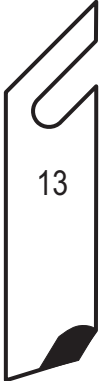



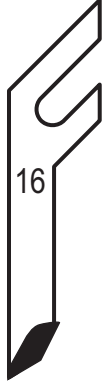

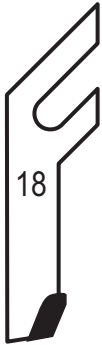
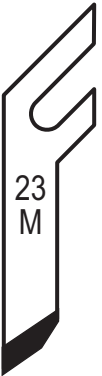





This type of cutter is designed for cutting a groove into the valve seat ring so that a suitable tool can be applied to remove the valve seat ring. Cutters C6 and C6.1 belong to this type of cutters.

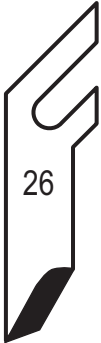

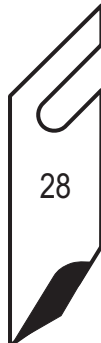

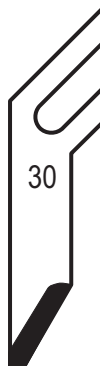


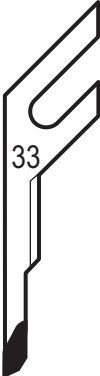
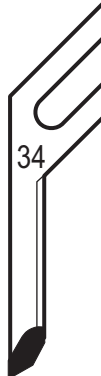
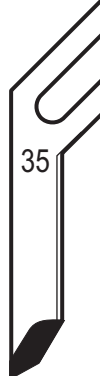

**Cutters for 45°, 30°, 35°, 25° and 20° adapter heads**

<b>Type</b>	<b>1</b>	<b>1M</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
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						
<b>Type</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>
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						








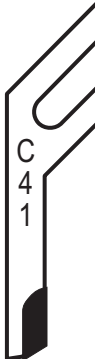
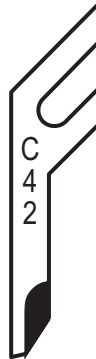



**Cutters for 45°, 30°, 35°, 25° and 20° adapter heads**

<b>Type</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>15M</b>	<b>16</b>
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						
<b>Type</b>	<b>17</b>	<b>18</b>	<b>23M</b>	<b>24</b>	<b>24M</b>	<b>25</b>
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**

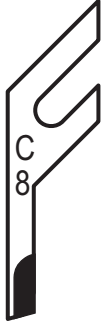
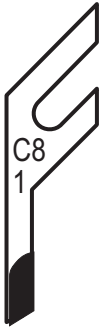
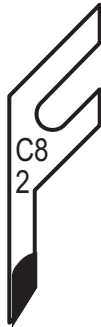

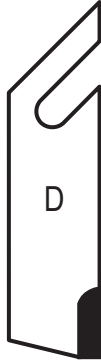




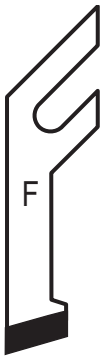
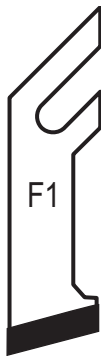

<b>Type</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>	<b>31</b>
Order-No.	216 64 627	216 64 214	216 64 234	216 64 113	216 64 133	216 64 134
for seat dia. mm	22 - 38	20 - 36	25 - 42	22 - 38	16 - 40	28 - 44
Refacing seats	yes	yes	yes	yes	no	yes
Top correction	20°	30°	30°	0°	-	35°
Bottom correcton	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						
<b>Type</b>	<b>32</b>	<b>33</b>	<b>34</b>	<b>35</b>	<b>36</b>	
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**

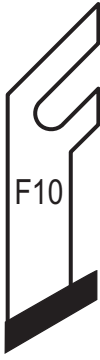


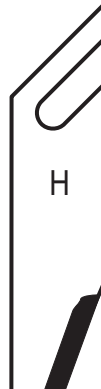
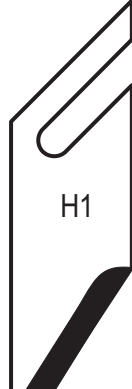
<b>Type</b>	<b>A</b>	<b>A1</b>	<b>B</b>	<b>B1</b>	<b>C</b>	<b>C1</b>
Order-No.	216 61 110	216 61 112	216 61 130	216 61 131	216 61 210	216 61 560
for seat dia. mm	20 - 40	25 - 42	34 - 54	48 - 60	20 - 40	17 - 37
Refacing seats	yes	yes	yes	yes	yes	yes
Top correction	-	-	-	-	-	-
Bottom correcton	-	-	-	-	-	-
Seat location	surface	surface	surface	surface	recessed	recessed
Application	universal	universal	universal	universal	universal	universal
Drawn to scale						
<b>Type</b>	<b>C4</b>	<b>C4-1</b>	<b>C4-2</b>	<b>C6</b>	<b>C6-1</b>	<b>C7</b>
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						



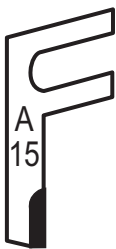
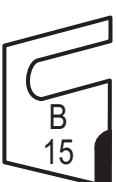
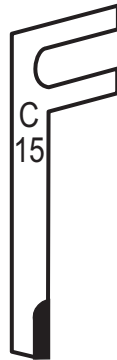
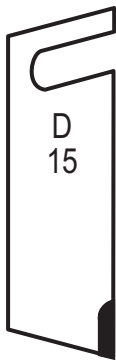

**Cutters for 45°, 30°, 35°, 25° und 20° adapter heads**

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

**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**



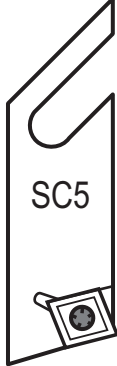
Type	A/15	B/15	C/15	D/15	D1/15
Order-No.	216 61 120	216 61 140	216 61 220	216 69 211	216 69 212
for seat dia. mm	20 - 40	38 - 58	20 - 40	38 - 58	28 - 48
Seat location	surface	surface	recessed	recessed	recessed
Application	universal	universal	universal	universal	universal
Drawn to scale					

**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><b>Type</b>                      Part No.                      For seat dia. mm                      Seat refacing                      Top correction                      Bottom correction                      Seat location                      Application</p>	<p><b>SC1</b>                      216 65 110                      23 - 43                      yes                      -                      -                      surface &amp; recessed                      universal</p>	<p><b>SC2</b>                      216 65 100                      28 - 48                      yes                      -                      -                      surface &amp; recessed                      universal</p>	<p><b>SC5</b>                      216 65 120                      40 - 60                      yes                      -                      -                      surface &amp; 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:**

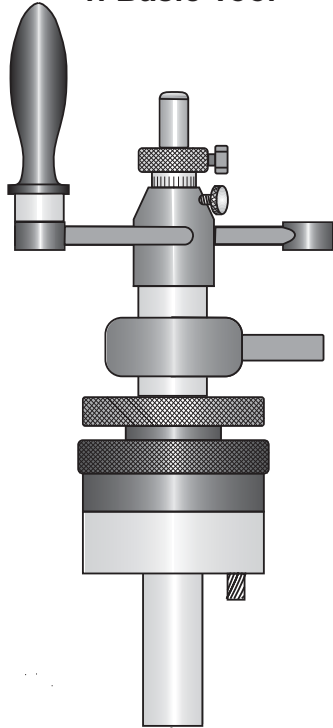
Valve seat diameter range 30 - 90mm  
Valve seat angles 45°, 35°, 30°,  
25°, 20°, 15° & 0°

**Application:**

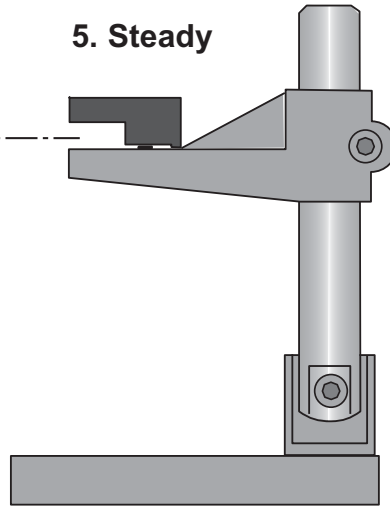
Commercial vehicles  
Locomotives  
Marine and stationary diesels

Item Description	Part No.	
<b>1. VDS2 Basic Tool</b>	237 10 002	
The gear head of the basic unit is designed to receive an adapter head for the respective seat angle.		
<b>2. Adapter Heads</b>		
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	
<b>Complete Refacing Units:</b>		
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	
<b>3. Pilots</b>	page 22	
A pilot series VD2 is required for aligning the refacing unit		
<b>4. Cutters</b>		
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	
<b>5. Steady (page 28)</b>	216 55 500	
<b>6. Service Tools</b>		
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	
<b>7. Storage case type 2A</b>	217 90 041	
<b>8. Kits</b>		
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

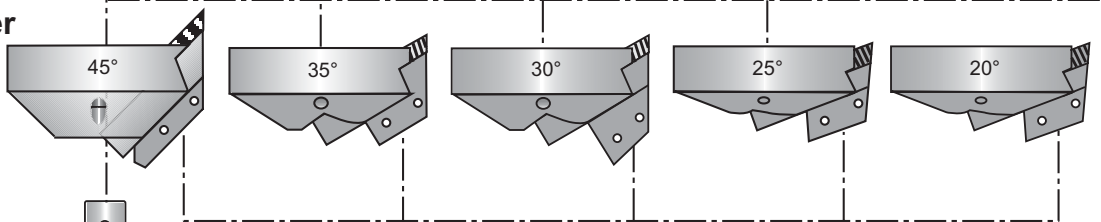
1. Basic Tool



5. Steady



2. Adapter Heads



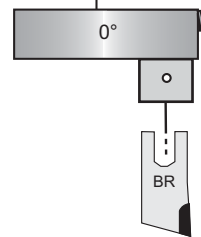
3. Pilot



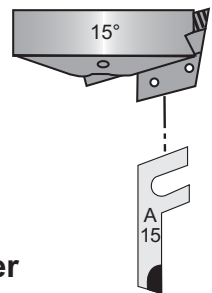
4.1 Cutter



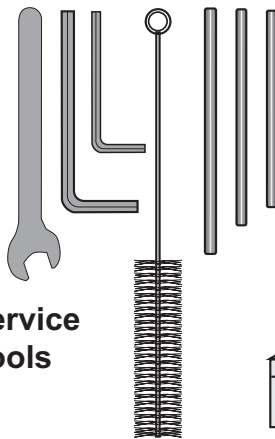
4.3 Cutter



4.2 Cutter



6. Service Tools



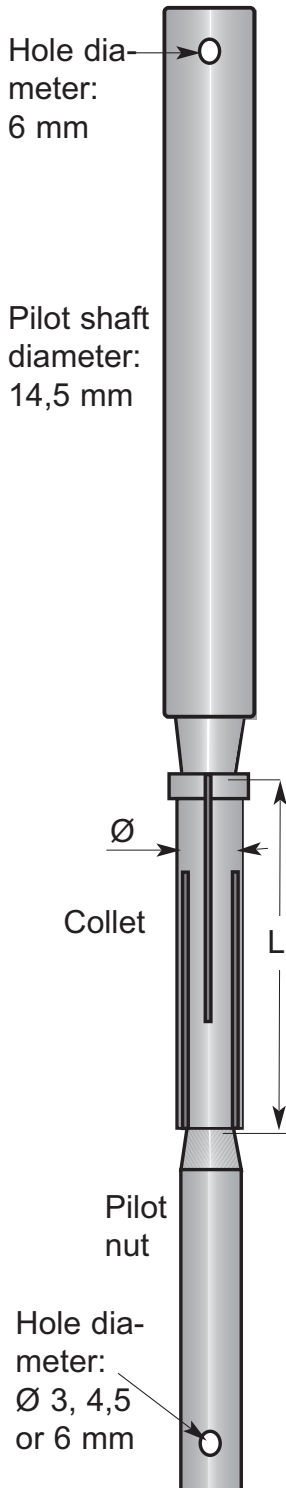
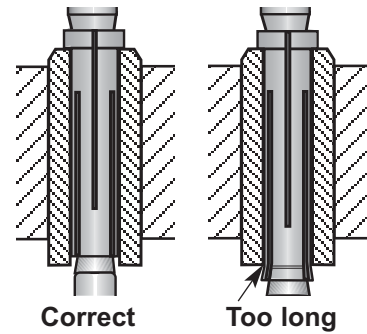
7. Storage Case



**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.







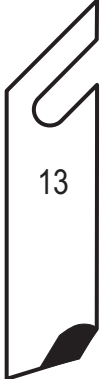


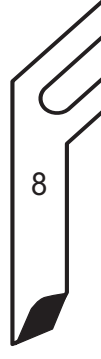


Expanding diameter Ø mm	Collet length L mm	Pilot size	Pilot incl. Collet Part No.	Spare & add. collets Part No.
7,9 - 8,4	38	8/2	217 75 122	216 75 522
↓	52	↓	217 71 122	216 71 522
8,4 - 8,9	38	↓	217 75 123	216 75 523
↓	52	↓	217 71 123	216 71 523
8,9 - 9,4	44	9/2	217 75 132	216 75 532
↓	59	↓	217 71 132	216 71 532
9,4 - 9,9	44	↓	217 75 133	216 75 533
↓		↓		
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	↓	217 75 143	216 75 543
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	↓	217 75 148	216 75 548
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	↓	217 75 153	216 75 553
↓	84	↓	217 71 153	216 71 553
12,9 - 13,4	92	13/2	217 71 157	217 71 557
13,4 - 13,9	92	↓	217 71 158	217 71 558
13,9 - 14,4	100	14/2	217 71 162	217 71 562
14,4 - 14,9	100	↓	217 71 163	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 71 173	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

Solid pilots for Series 2 are available from diameter 7 - 15 mm on request (like Series 1 on page 10).



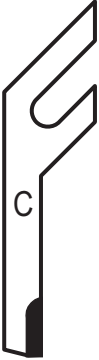


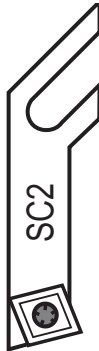


**Cutters for 45°, 35°, 30°, 25° and 20° adapter heads  
for seat refacing and correction**

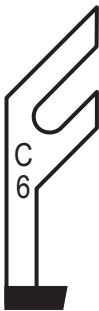

<b>Type</b>	<b>1</b>	<b>1M</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Part No.	216 64 110	216 64 112	216 64 130	216 64 210	216 64 230	216 64 460
for seat dia. mm	35 - 60	30 - 60	45 - 90	35 - 60	45 - 90	45 - 90
Refacing seats	yes	yes	yes	yes	yes	yes
Top correction	15°	15°	15°	15°	15°	15°
Bottom correcton	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						
<b>Type</b>	<b>13</b>	<b>25</b>	<b>32</b>	<b>C8</b>		
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**

<b>Typ</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>SC1</b>	<b>SC2</b>
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**

<b>Type</b>	<b>C6</b>	<b>C6.1</b>
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

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:**

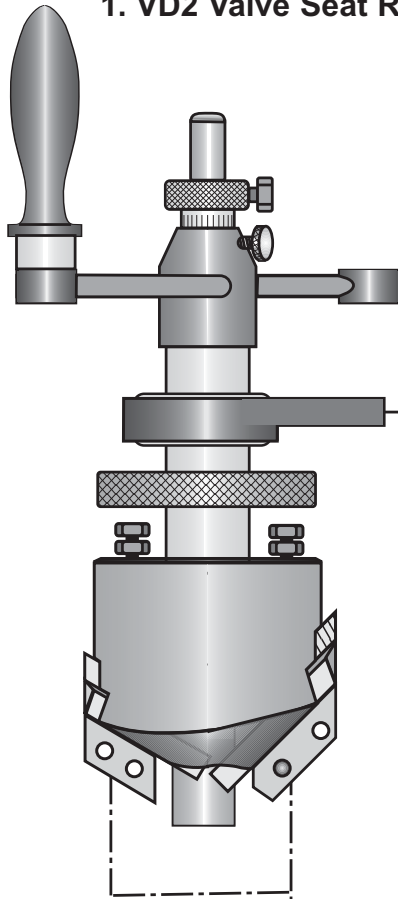
Commercial vehicles  
Locomotives  
Marine and stationary diesels

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.

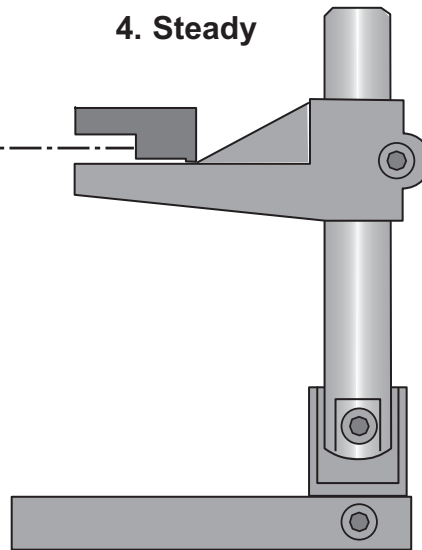
Item. Description	Part No.
<b>1. VD2 Refacing Tool for 45° &amp; 30° Seats</b>	217 21 000
<b>2. Pilots</b>	page 22
A pilot series VD2 is required for aligning the refacing unit in centerline with the valve guide.	
<b>3. Cutters</b>	pages 23 - 24
A wide range of cutters are available to match every requirement	
<b>4. Steady (page 28)</b>	216 55 500
The steady supports the refacing unit just below the crank handle.	
<b>5. Service Tools</b>	
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
<b>6. Storage case type 2A</b>	217 90 041
<b>7. Kits</b>	
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, Pielstick, Hanomag and Magirus engines.

1. VD2 Valve Seat Refacing Tool



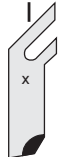
4. Steady



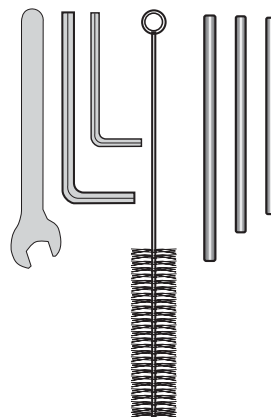
2. Pilot



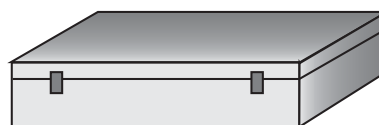
3. Cutter



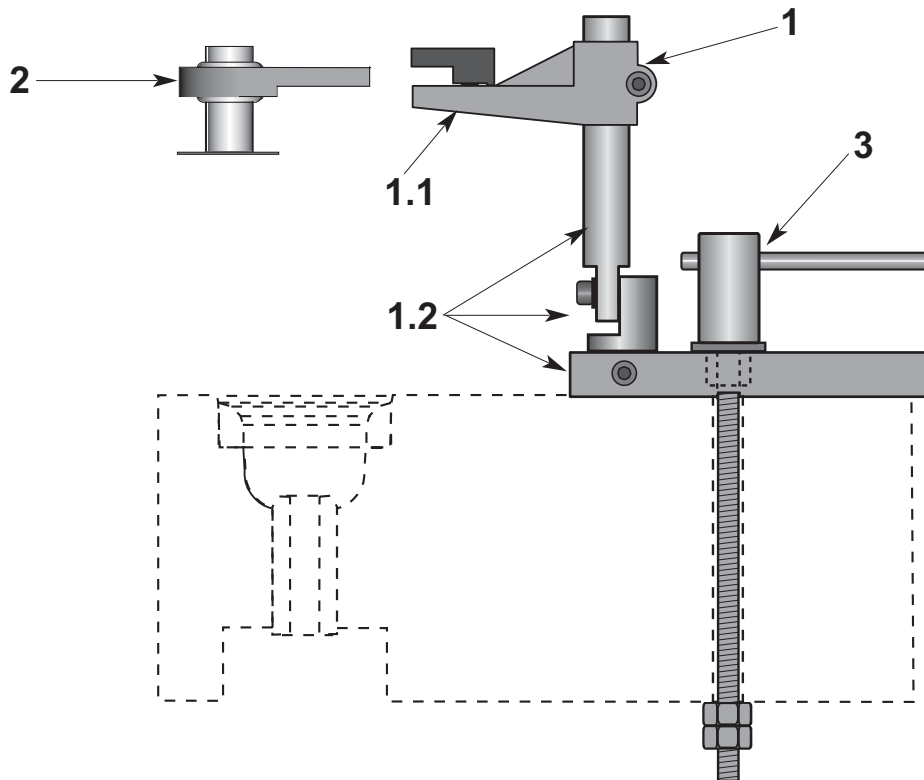
5. Service Tools



6. Storage Case



Steady



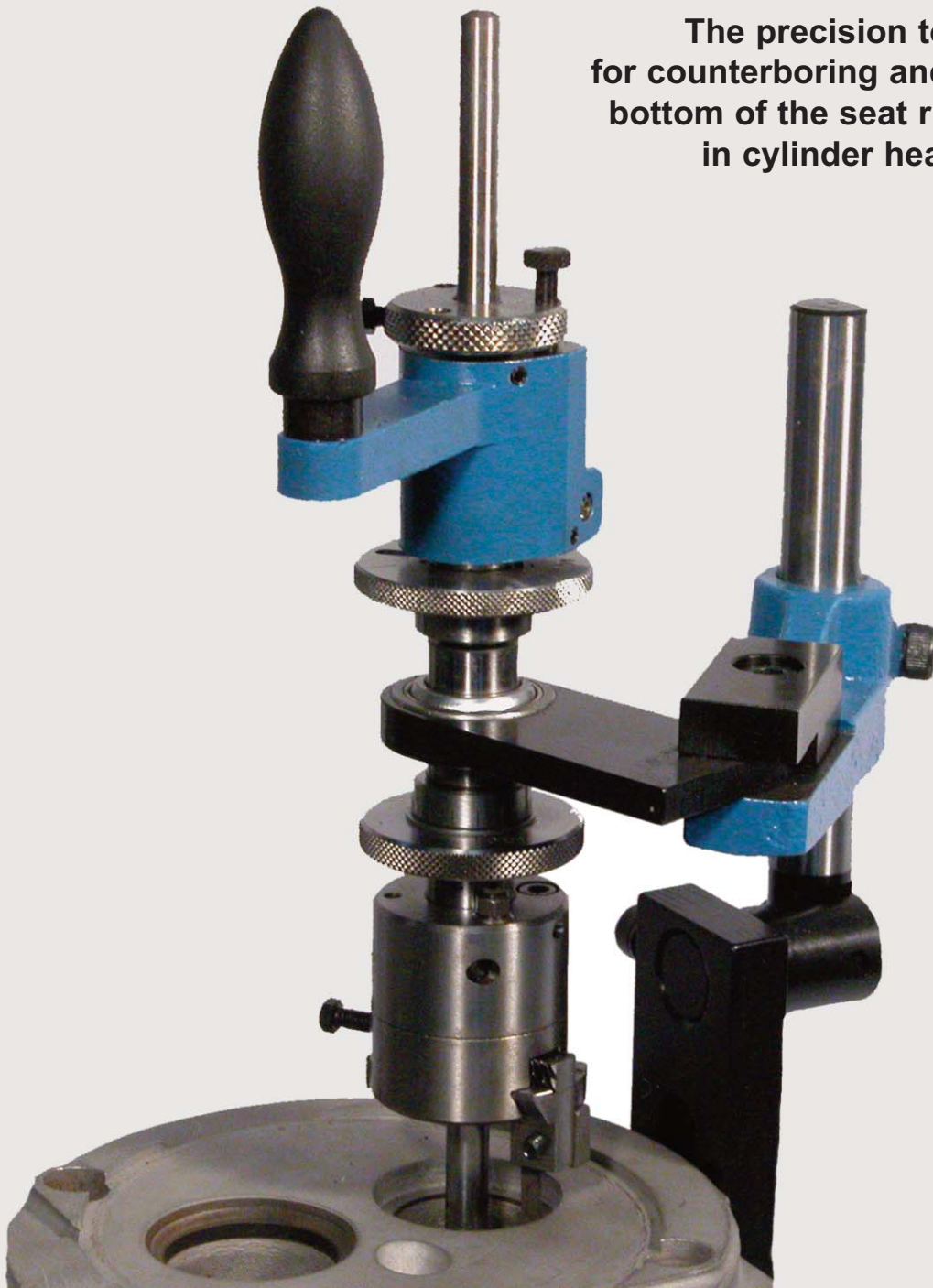
The swivelling guide arm (2) of a refacing unit can be locked in place by means of the steady which prevents lateral displacement of the refacing unit.

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.	<b>Steady</b>	<b>216 55 500</b>
	consisting of	
1.1	<b>Steady Clamp</b>	<b>216 55 220</b>
1.2	<b>Base Member</b> with universal joint and post	<b>216 55 510</b>
2.	<b>Conversion Kit for VD1</b>	<b>216 21 700</b>
	<b>Conversion Kit for VD2</b>	<b>217 21 700</b>
3.	<b>Rapid Clamp</b>	<b>216 55 520</b>

The precision tools  
for counterboring and refacing  
bottom of the seat ring bores  
in cylinder heads



### **RDS1**

**Capacity:**

Boring diameter range 20 - 60 mm

**Application**

Motorcycles  
Cars  
Light commercial vehicles

### **RDS2**

**Capacity:**

Boring diameter range 30 - 90 mm

**Application**

Commercial vehicles  
Locomotives  
Marine and stationary diesels



The Hunger RDS 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 RDS 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 RDS 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 RDS against lateral displacement. Pilots and steady for the Hunger VD Valve Seat Refacing Tools also suit for the RDS. 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 counter-bore diameter.

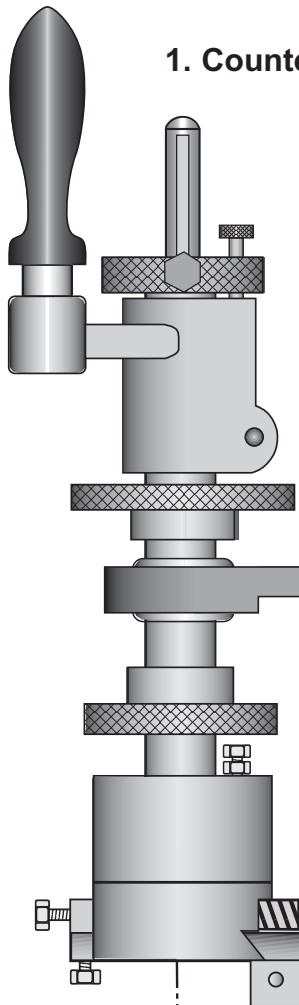
### Hunger RDS1 - Order Information

Item	Description	Part No.
1.	<b>RDS1 Counterboring Tool</b>	<b>219 20 000</b>
2.	<b>Pilots Series VD1</b>	pages 9 - 10
3.	<b>Cutters</b>	page 32
4.	<b>Universal Steady</b> (page 28)	<b>216 55 500</b>
5.	<b>Service Tools</b>	
	Open End Wrench 7mm	<b>863 01 007</b>
	Hex Key 4mm	<b>863 20 045</b>
	Tommy bars for mounting pilots	page 10
6.	<b>Storage Case for RDS1</b>	<b>219 90 044</b>
-	<b>RDS1 Kit</b>	<b>219 00 100</b>
	including RDS1 tool, cutter types AR, BR, CR, DR and service tools packed in the sturdy storage case	

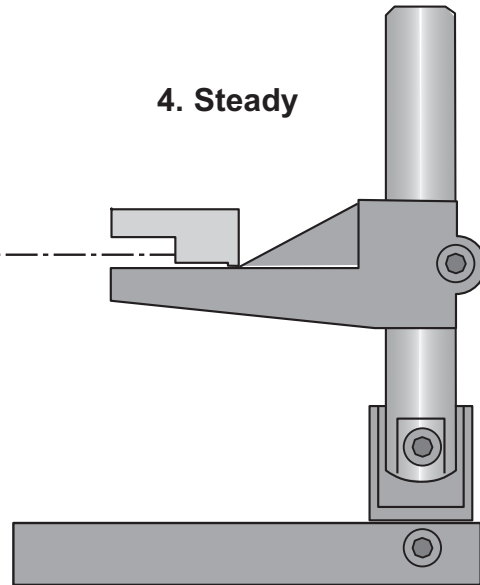
### Hunger RDS2 - Order Information

Item	Description	Part No.
1.	<b>RDS2 Counterboring Tool</b>	<b>220 20 000</b>
2.	<b>Pilots Series VD2</b>	page 22
3.	<b>Cutters</b>	page 32
4.	<b>Universal Steady</b> (page 28)	<b>216 55 500</b>
5.	<b>Service Tools</b>	
	Open End Wrench 7mm	<b>863 01 007</b>
	Open End Wrench 10 mm	<b>863 01 010</b>
	Hex Key 4mm	<b>863 20 045</b>
	Tommy bars for mounting pilots	page 10
6.	<b>Storage Case for RDS2</b>	<b>220 90 045</b>
-	<b>RDS1 Kit</b>	<b>220 00 100</b>
	including RDS1 tool, cutter types AR, BR, CR, DR and service tools packed in the sturdy storage case	

**1. Counterboring Tool**



**4. Steady**



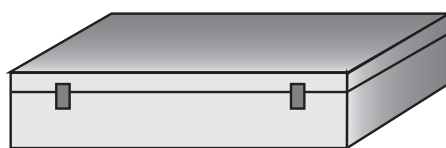
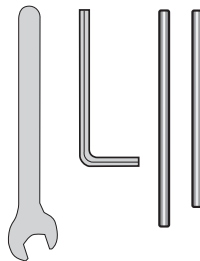
**2. Pilot**



**3. Cutter**



**5. Service Tools**







**6. Storage Case**

Cutters




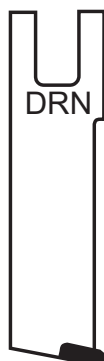
**Cutters for Counterboring and Refacing**

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 RDS1	20 - 37	35 - 60	20 - 37	35 - 60
with RDS2	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 RDS1	20 - 37	35 - 60	20 - 37	35 - 60
with RDS2	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 diameter

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

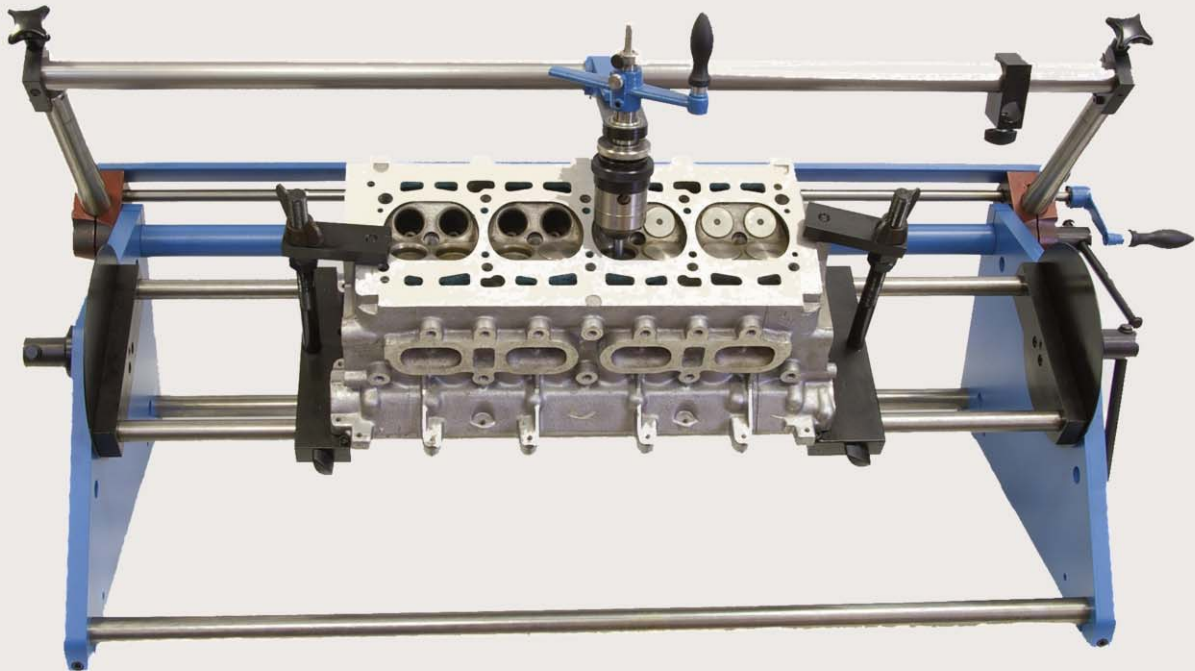
**Application:**

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:**

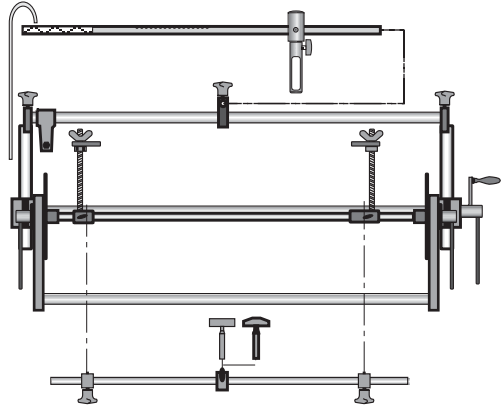
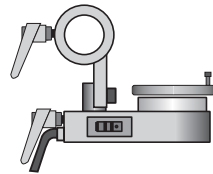
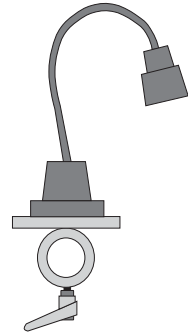




Motorcycle engine service  
Car engine service  
Truck engine service

#### **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.	<b>K2000 Cylinder Head Stand</b> 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.	<b>Electromagnetic Support</b> for locking the swivelling guide arm of a VD valve seat refacing unit. Includes a 24 V power supply unit for connection to 230 V AC.	221 40 100	
3.	<b>Work Light</b> 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 230 V AC.	221 90 100	
4.	<b>Plunger Ø 22mm</b> for compressing valve springs located in narrow recesses sind.	221 20 058	
5.	<b>Plunger Ø 30 mm</b> for compressing very large valve springs	221 20 054	
6.	<b>Items for updating cylinder head stands</b> supplied before 1996:		
	<b>Swivelling holder</b>	221 20 052	
	<b>Plunger Ø 26 mm</b>	221 20 056	



## VKM1M

the sturdy precision machine  
for the professional



### Specifications:

#### Wheelhead:

Wheel diameter	175 mm
Wheel speed	2790 rpm
Drive motor	370 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	620 mm
Overall width	610 mm
Overall height	450 mm
Net weight	approx. 105 kg

### Capacity:

Valve stem diameter	4 - 20 mm
Max. valve head diameter	120 mm

### Application:

Motorcycles  
Cars and Commercial Vehicles  
Marine and Stationary Diesels

### Recommended

by leading engine  
manufacturers

**Valve Grinding Machine**

**Machine Base**

Heavily ribbed cast iron structure for vibration-free performance.

Adjustable slideways for wheelhead in-feed and workhead traverse ensure long-lasting accuracy.

**Wheelhead:**

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

**Workhead:**

The workhead is located on a swivel plate which can be set to the required angular position by means of a wide-spaced scale. Work spindle fitted with collet chuck for use of precision collets for chucking the valves.

**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. Main switch fitted with undervoltage release

Item	Description	Part No.
<b>1.</b>	<b>VKM1M Valve Grinding Machine</b> wired for supply voltage	
<b>1.1</b>	<b>400V±10% 3 phase 50/60 cycles</b>	<b>231 00 003</b>
<b>1.2</b>	<b>230V±10% 3 phase 50/60 cycles</b> Standard equipment including grinding wheel, dressing diamond, wet grinding attachment and service tools.	<b>231 00 004</b>
<b>2.</b>	<u>Precision collets for chucking the valves</u>	
<b>2.1</b>	<b>Collet Set Type R5-14</b> for chucking valves with stem diameter from 4 to 14mm	<b>824 32 514</b>
<b>2.2</b>	<b>Collet Set Type R5-18</b> for chucking valves with stem diameter from 4 to 18mm Individual collets on request.	<b>824 32 518</b>
<b>3.</b>	<u>Options</u>	
<b>3.1</b>	<b>Speed Control</b> for infinitely adjusting the workspindle speed in the range from 10 to 170 rpm.	<b>231 40 200</b>
<b>4.</b>	<u>Accessories</u>	
<b>4.1</b>	<b>Valve Stem End Grinding Attachment</b>	<b>231 91 100</b>
<b>4.2</b>	<b>Rocker Arm Grinding Attachment</b>	<b>231 91 200</b>
<b>5.</b>	<u>Consumeable Items</u>	
<b>5.1</b>	<b>Grinding Wheel 175x25 EK</b>	<b>861 51 260</b>
<b>5.2</b>	<b>Grinding Wheel 175x25 SC</b> for hard faced valves.	<b>861 51 250</b>
<b>5.3</b>	<b>Dressing Diamond</b>	<b>861 80 025</b>



**Removing valve guides from cylinder head**

**Installing new valve guides in cylinder head**

**Removing seat ring inserts from cylinder head**



Technical changes reserved

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
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**1. PVM1 Tool Kit**

**250 10 500**

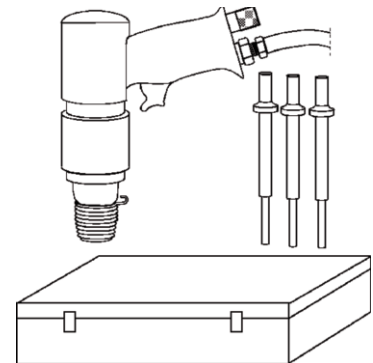
for removing and installing valve guides.

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.



**2. Drivers**

for removing and installing valve guide bushes

Nominal diam: for valve guide diam.:

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



**3. Expendable Washers**

for the drivers to protect the valve guide bushings.

(5 pieces each) for driver with nominal diam.:

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

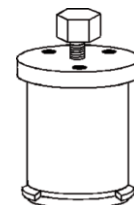


**4. Expanding Adapters**

for removing valve seat rings

Expanding adapter A for ring diam. 25 - 35 mm 250 15 250

Expanding adapter lJB for ring diam 35 - 45 mm 250 15 350



**5. Drivers**

**for Expanding Adapters**

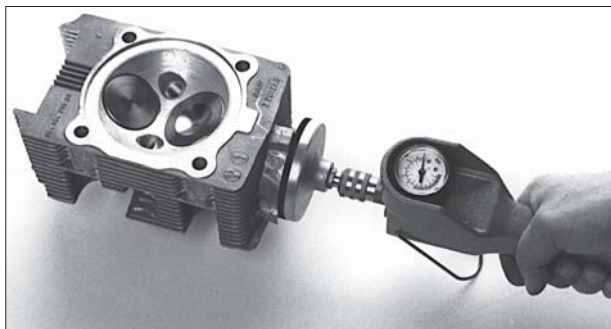
Driver 11,8 mm diam. 250 15 118

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).

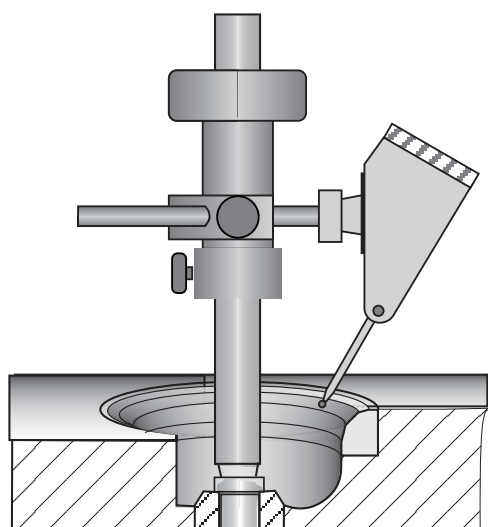
### Application:

Motorcycles  
Cars  
Commercial vehicles

### Order Information:

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

## 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

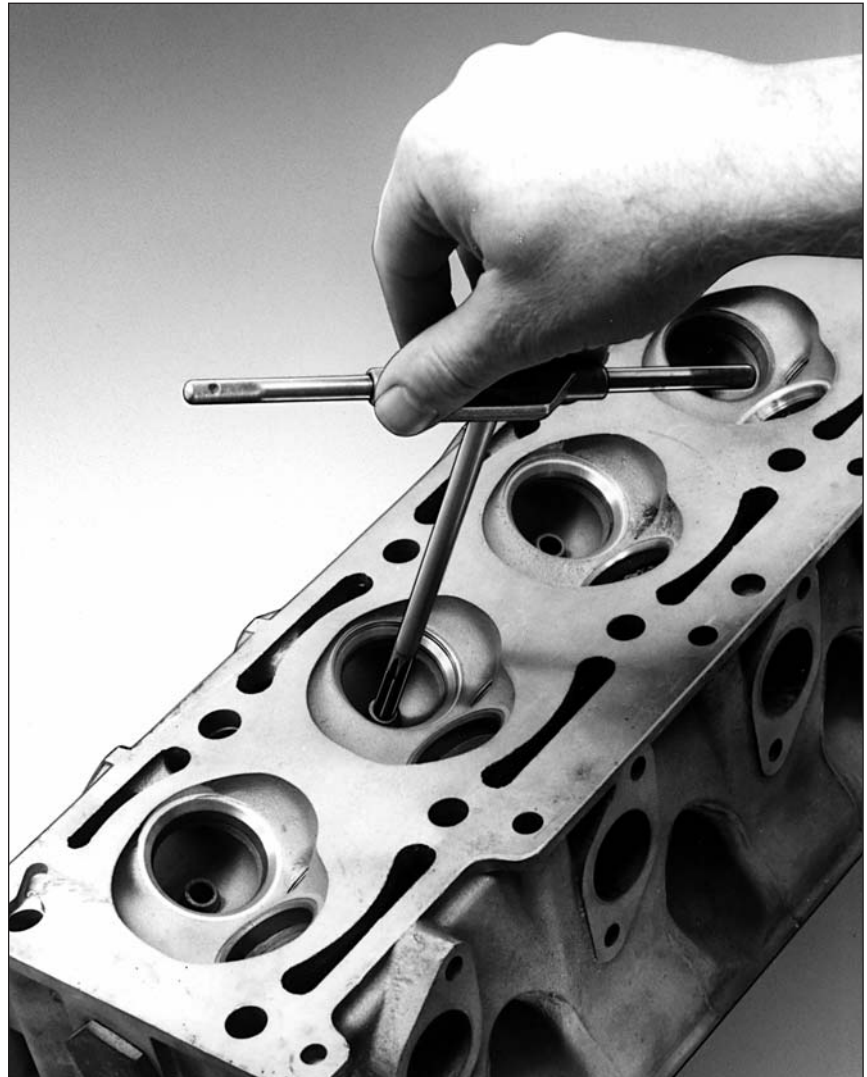
### Order Information:

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

Type  
VR



Type  
V



Optional  
Centering Bush



### Hunger Reamer Types VR and V

for reaming valve guides.

Type VR solid

Type V adjustable

#### Application:

Motorcycles

Cars

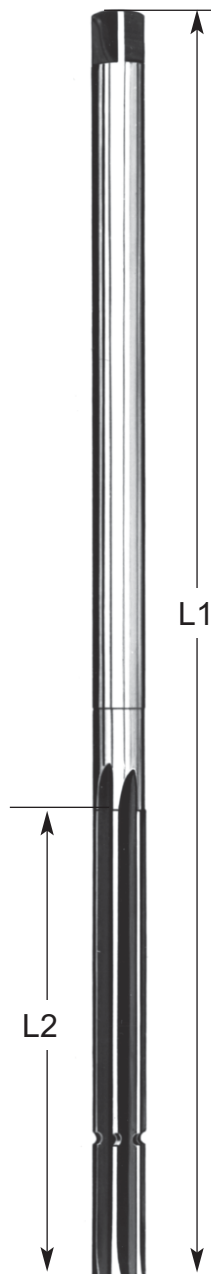
Trucks and other commercial vehicles

#### Recommended

by leading engine manufacturers

Typ VR

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.  
 An optional centering bush is available for each reamer size. The centering bush fits firmly in the valve seat so that the reamer aligns perfectly with the bore.



L1 = 234mm  
 L2 = 70mm

Standard Sizes

Size Ø mm	Part No.
5,00 H7	172 05 000
6,00 H7	172 06 000
6,99 H7	172 07 038
7,00 H7	172 07 000
7,99 H7	172 08 030
8,00 H7	172 08 000
8,99 H7	172 09 004

Size Ø mm	Part No.
9,00 H7	172 09 000
10,00 H7	172 10 000
10,99 H7	172 11 001
11,00 H7	172 11 000
11,97 H7	172 11 970
11,99 H7	172 12 001
12,00 H7	172 12 000

Special Sizes\*

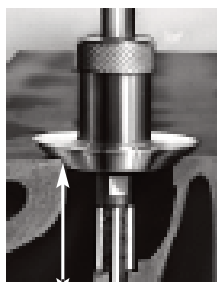
Size Ø mm	Part No.
4,98 H7	172 05 498
4,99 H7	172 05 499
5,49 H7	172 06 016
5,50 H7	172 06 002
5,98 H7	172 06 598
5,99 H7	172 06 020
6,02 H7	172 06 602
6,60 H7	172 07 022

Size Ø mm	Part No.
6,98 H7	172 07 698
7,95 H7	172 08 028
7,96 H7	172 08 035
8,02 H7	172 08 023
8,03 H7	172 08 021
8,97 H7	172 09 081
8,98 H7	172 09 054
9,02 H7	172 09 031

\*No stock standard.

The listed special sizes and also further special sizes up to 13 mm diameter are available at short notice.  
 State desired reamer diameter and tolerance when ordering.

**Type V**



Centering Bush

**Application Range**

The special reamer for reaming the valve guide of engines.

The optional centering bush fits in the valve seat so that the reamer aligns perfectly in the valve guide.

**Description**

Right-hand cutting reamer with extra long shank and an optional centering bush.

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

Size	Reamers							Centering Bush	
	Range		Length Overall L1 mm	Length Blades L 2 mm	WAF a mm	No. of Blades	Weigth kg	Conicity mm	Weight kg
	mm	Inches							
V 5,4	5,4 - 6	7/32 - 15/64	160	28	4	3	0,025	14-21	0,030
V 5,9	5,9 - 6,5	15/64 - 1/4	160	28	4,3	3	0,030	17-28	0,050
V 6,4	6,4 - 7	1/4 - 17/64	160	28	4,9	3	0,035	16-28	0,050
V 6,9	6,9 - 7,5	17/64 - 19/64	160	28	5,5	3	0,040	21-38	0,070
V 7,4	7,4 - 8	19/64 - 5/16	165	28	5,5	3	0,045	22-36	0,065
V 7,9	7,9 - 8,5	5/16 - 21/64	170	28	6,2	3	0,055	23-47	0,150
V 8,4	8,4 - 9	21/64 - 23/64	175	28	6,2	3	0,065	28-44	0,155
V 8,9	8,9 - 9,5	23/64 - 3/8	180	32	7	4	0,075	25-53	0,190
V 9,4	9,4 - 10	3/8 - 25/64	190	32	7	4	0,085	26-52	0,180
V 9,9	9,9 - 11	25/64 - 7/16	200	36	8	5	0,100	25-53	0,190
V10,9	10,9 - 12	7/16 - 15/32	220	36	8	5	0,130	33-61	0,270

**Ordering Information**

The production of reamers with hard chrome coated blades and of hard chrome coated replacementblades has been discontinued.  
Remaining stocks of almost all reamer sizes are still available while stocks last.

As an advanced alternative to the hard chrome version, Hunger now offers the DLC version, in which the blades are coated with diamond-like carbon (DLC).  
See page 44 for details.

Size	Reamers		Centering Bushes Part No.	Replacement Blades		Nuts Part No.
	Special Steel Part No.	Hard Chrome Part No.		Special Steel Part No.	Hard Chrome Part No.	
V 5,4	140 01 000	141 01 000	140 01 600	140 01 400	141 01 400	140 01 510
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

Packing of the reamers: Individually in clear plastic tube containers.

**Sets of Reamers Type V in Wooden Cases**

Symbol	Range		No. of Reamers	No. of Bushes	Special Steel Part No.	Hard Chrome Part No.	Weight kg
	mm	Inches					
VR	5,9 - 12	15/64 - 15/32	10	-	140 00 100	141 00 100	1,140
VRB	5,9 - 12	15/64 - 15/32	10	10	140 00 200	141 00 200	3,500



## DLC

**Description**

The blades of the reamers type V version DLC are coated with a diamond-like hard material layer, which is applied by a complex PVD process.

The DLC coating is characterized by extreme hardness, wear resistance and smoothness (very low friction).

At the same time, the sharpness of the cutting edges is maintained because the DLC coating is extremely thin.

The DLC version of the reamers type is therefore ideal for titanium alloys, copper alloys (bronze and brass) as well as materials with a high wear effect and materials that tend to stick and form built-up edges.

Size	Reamer DLC Part No.	Replacement Blades DLC Part No.	Spare Nut Part No.	Option Guide Bush Part No.
<b>V 5,4</b>	148 01 000	148 01 400	140 01 510	140 01 600
<b>V 5,9</b>	148 02 000	148 02 400	140 02 510	140 02 600
<b>V 6,4</b>	148 03 000	148 03 400	140 03 510	140 03 600
<b>V 6,9</b>	148 04 000	148 04 400	140 04 510	140 04 600
<b>V 7,4</b>	148 05 000	148 05 400	140 05 510	140 05 600
<b>V 7,9</b>	148 06 000	148 06 400	100 08 510	140 06 600
<b>V 8,4</b>	148 07 000	148 07 400	140 07 510	140 07 600
<b>V 8,9</b>	148 08 000	148 08 400	140 08 510	140 08 600
<b>V 9,4</b>	148 09 000	148 09 400	140 09 510	140 09 600
<b>V 9,9</b>	148 10 000	148 10 400	140 10 510	140 10 600
<b>V10,9</b>	148 11 000	148 11 400	140 11 510	140 11 600

Each reamer is packaged in a clear plastic tube.

**Type D**

**Application Range**

The standard reamer for repair and assembly jobs.

**Description**

Right-hand cutting reamer with expanding blades.

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

From size D 12 the front adjusting nut is marked with a circumferential scale.

One graduation of the scale corresponds to a 0,01 mm change in cutting diameter.



Size	Adjustment Range		Length Overall L1 mm	Length Blades L2 mm	Size of Square a mm	Number of Blades	Weight kg
	mm	Inches					
<b>D 6,4</b>	6,4 - 7,2	1/4 - 9/32	111	32	3	4	0,015
<b>D 7,2</b>	7,2 - 8	9/32 - 5/16	111	32	3,5	4	0,015
<b>D 8</b>	8 - 9	5/16 - 23/64	111	32	4,3	5	0,025
<b>D 9</b>	9 - 10	23/64 - 25/64	115	32	4,3	5	0,035
<b>D 10</b>	10 - 11	25/64 - 7/16	120	35	4,9	5	0,040
<b>D 11</b>	11 - 12	7/16 - 15/32	125	35	6,2	5	0,045
<b>D 12</b>	12 - 13,5	15/32 - 17/32	130	42	6,2	5	0,075
<b>D 13,5</b>	13,5 - 15,5	17/32 - 39/64	145	50	7	5	0,100
<b>D 15,5</b>	15,5 - 18	39/64 - 45/64	165	60	8	5	0,155
<b>D 18</b>	18 - 21	45/64 - 53/64	180	65	9	5	0,225
<b>D 21</b>	21 - 24	53/64 - 15/16	190	70	10	5	0,320
<b>D 24</b>	24 - 27,5	15/16 - 1 5/64	205	75	11	5	0,430
<b>D 27,5</b>	27,5 - 31,5	1 5/64 - 1 15/64	225	80	12	6	0,600
<b>D 31,5</b>	31,5 - 37	1 15/64 - 1 29/64	240	90	14,5	6	0,870
<b>D 37</b>	37 - 45	1 29/64 - 1 49/64	285	100	16	6	1,410
<b>D 45</b>	45 - 55	1 49/64 - 2 5/32	320	109	20	6	2,320
<b>D 55</b>	55 - 65	2 5/32 - 2 9/16	350	120	24	8	3,830
<b>D 65</b>	65 - 80	2 9/16 - 3 5/32	460	145	29	10	6,800
<b>D 80</b>	80 - 95	3 5/32 - 3 47/64	490	150	32	10	10,250
<b>D 95</b>	95 - 110	3 47/64 - 4 21/64	490	150	36	10	13,700

Packaging of the reamers.

From size D 6,4 to D 45 individually in transparent packaging tubes.

Size D 55 in a plastic net.

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

**Boxed Sets of Reamers Type D**

Type	Adjustment Range		Number of Reamers	Weight kg
	mm	Inches		
<b>DAN</b>	8 - 31,5	21/64 - 1 15/64	11	3,100
<b>DEN</b>	8 - 45	21/64 - 1 49/64	13	5,700



## Description

The blades of the standard reamers type D are made of a special steel with excellent cutting properties.

Hunger has also manufactured a "hard chrome" version in which the blades are coated with hard chrome. The hard chrome coating has a low coefficient of friction.

Hard chrome reamers are therefore particularly suitable for reaming materials with a high wear tendency and materials that tend to stick and form built-up edges.

Hard chrome reamers and hard chrome replacement blades have been discontinued.  
 Remaining stocks of nearly all reamer sizes are available while supplies last.

As an advanced alternative to the hard chrome version, Hunger now offers the DLC version, in which the blades are coated with diamond-like carbon (DLC), See page 47 for details.

## Ordering Information

Size	Size Range mm	Reamers		Replacement Blades*		Spare Nuts Part No.
		Special Steel Part No.	Hard Chrome Part No.	Special Steel Part No.	Hard Chrome Part No.	
<b>D 6,4</b>	6,4 - 7,2	100 06 000	101 06 000	100 06 400	101 06 400	140 02 510
<b>D 7,2</b>	7,2 - 8	100 07 000	101 07 000	100 06 400	101 06 400	140 04 510
<b>D 8</b>	8 - 9	100 08 000	101 08 000	100 08 400	101 08 400	100 08 510
<b>D 9</b>	9 - 10	100 09 000	101 09 000	100 09 400	101 09 400	100 09 510
<b>D 10</b>	10 - 11	100 10 000	101 10 000	100 10 400	101 10 400	100 10 510
<b>D 11</b>	11 - 12	100 11 000	101 11 000	100 11 400	101 11 400	100 11 510
<b>D 12</b>	12 - 13,5	100 12 000	101 12 000	100 12 400	101 12 400	100 12 520
<b>D 13,5</b>	13,5 - 15,5	100 13 000	101 13 000	100 13 400	101 13 400	100 13 520
<b>D 15,5</b>	15,5 - 18	100 15 000	101 15 000	100 15 400	101 15 400	100 15 520
<b>D 18</b>	18 - 21	100 18 000	101 18 000	100 18 400	101 18 400	100 18 520
<b>D 21</b>	21 - 24	100 21 000	101 21 000	100 21 400	101 21 400	100 21 520
<b>D 24</b>	24 - 27,5	100 24 000	101 24 000	100 24 400	101 24 400	100 24 520
<b>D 27,5</b>	27,5 - 31,5	100 27 000	101 27 000	100 27 400	101 27 400	100 27 520
<b>D 31,5</b>	31,5 - 37	100 31 000	101 31 000	100 31 400	101 31 400	100 31 520
<b>D 37</b>	37 - 45	100 37 000	101 37 000	100 37 400	101 37 400	100 37 520
<b>D 45</b>	45 - 55	100 45 000	101 45 000	100 45 400	101 45 400	100 45 520
<b>D 55</b>	55 - 65	100 55 000	101 55 000	100 55 400	101 55 400	100 55 520
<b>D 65</b>	65 - 80	100 65 000	101 65 000	100 65 400	101 65 400	100 65 520
<b>D 80</b>	80 - 95	100 80 000	101 80 000	100 80 400	101 80 400	100 80 520
<b>D 95</b>	95 - 110	100 95 000	101 95 000	100 95 400	101 95 400	100 95 520

\*Replacement blades are supplied in matched sets.

## Sets of Reamers Type D in Wooden Cases

Symbol	Size Range mm	Special Steel Part No.	Hard Chrome Part No.
<b>DAN</b>	8 - 31,5	100 00 100	101 00 100
<b>DEN</b>	8 - 45	100 00 200	101 00 200



**DLC**

The blades of the reamers type D version DLC are coated with a diamond-like hard material layer, which is applied by a complex PVD process.

The DLC coating is characterized by extreme hardness, wear resistance and smoothness (very low friction).

At the same time, the sharpness of the cutting edges is maintained because the DLC coating is extremely thin.

The DLC version of the reamers type is therefore ideal for reaming aluminum alloys, titanium alloys, copper alloys (bronze and brass) as well as materials with a high wear effect and materials that tend to stick and form built-up edges.

**Ordering Information**

<sup>D</sup> Size	Size Range mm	Reamers DLC Part No.	Replacement Blades* DLC Part No.	Sprare Nuts Part No.
<b>D 6,4</b>	6,4 - 7,2	108 06 000	108 06 400	140 02 510
<b>D 7,2</b>	7,2 - 8	108 07 000	108 06 400	140 04 510
<b>D 8</b>	8 - 9	108 08 000	108 08 400	100 08 510
<b>D 9</b>	9 - 10	108 09 000	108 09 400	100 09 510
<b>D 10</b>	10 - 11	108 10 000	108 10 400	100 10 510
<b>D 11</b>	11 - 12	108 11 000	108 11 400	100 11 510
<b>D 12</b>	12 - 13,5	108 12 000	108 12 400	100 12 520
<b>D 13,5</b>	13,5 - 15,5	108 13 000	108 13 400	100 13 520
<b>D 15,5</b>	15,5 - 18	108 15 000	108 15 400	100 15 520
<b>D 18</b>	18 - 21	108 18 000	108 18 400	100 18 520
<b>D 21</b>	21 - 24	108 21 000	108 21 400	100 21 520
<b>D 24</b>	24 - 27,5	108 24 000	108 24 400	100 24 520
<b>D 27,5</b>	27,5 - 31,5	108 27 000	108 27 400	100 27 520
<b>D 31,5</b>	31,5 - 37	108 31 000	10831 400	100 31 520
<b>D 37</b>	37 - 45	108 37 000	108 37 400	100 37 520
<b>D 45</b>	45 - 55	108 45 000	108 45 400	100 45 520
<b>D 55</b>	55 - 65	108 55 000	108 55 400	100 55 520
<b>D 65</b>	65 - 80	108 65 000	108 65 400	100 65 520
<b>D 80</b>	80 - 95	108 80 000	108 80 400	100 80 520
<b>D 95</b>	95 - 110	108 95 000	108 95 400	100 95 520

\* Replacement blades are supplied in matched sets.

**Application Range**

The reamer for reaming longer holes and adjacent inline holes.

**Description**

Right-hand cutting hand 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 process the blades have a progressively increasing clearance angle giving a softer cutting action.



Size	Adjustment Range		Length Overall L1 mm	Length Blades L2 mm	Size of Square a mm	Number of blades	Weight kg
	mm	Inche					
<b>E 10,5</b>	10,5 - 12	27/64 - 15/32	160	65	5,5	5	0,070
<b>E 12</b>	12 - 13,5	15/32 - 17/32	170	70	6,2	5	0,100
<b>E 13,5</b>	13,5 - 15,5	17/32 - 39/64	195	80	7	5	0,140
<b>E 15,5</b>	15,5 - 17,5	39/64 - 11/16	215	90	8	5	0,210
<b>E 17,5</b>	17,5 - 19,5	11/16 - 49/64	230	100	9	5	0,280
<b>E 19,5</b>	19,5 - 21,5	49/64 - 27/32	240	110	10	5	0,370
<b>E 21,5</b>	21,5 - 24,5	27/32 - 31/32	260	120	10	5	0,470
<b>E 24,5</b>	24,5 - 27,5	31/32 - 1 5/64	280	130	11	5	0,640
<b>E 27,5</b>	27,5 - 31,5	1 5/64 - 1 15/64	310	140	12	6	0,880
<b>E 31,5</b>	31,5 - 37	1 15/64 - 1 29/64	320	150	14,5	6	1,240
<b>E 37</b>	37 - 45	1 29/64 - 1 49/64	370	165	16	6	1,970
<b>E 45</b>	45 - 55	1 49/64 - 2 5/32	425	180	20	6	3,240

Packaging of the reamers.  
Individually in transparent packaging tubes.

**Boxed Sets of Reamers Type E**

Type	Adjustment Range		Number of Reamers	Weight kg
	mm	Inches		
<b>EA</b>	10,5 - 31,5	27/64 - 1 15/64	9	3,100
<b>ESO</b>	10,5 - 45	27/64 - 1 49/64	11	5,700

### Ordering Information

The production of reamers with hard chrome coated blades and of hard chrome coated replacement blades has been discontinued.  
Remaining stocks of almost all reamer sizes are still available while stocks last.

Size	Range	Reamers		Replacement Blades*		Nuts Part No.
		Special Steel Part No.	Hard Chrome Part No.	Special Steel Part No.	Hard Chrome Part No.	
<b>E 10,5</b>	10,5 - 12	110 10 000	111 10 000	110 10 400	111 10 400	140 10 510
<b>E 12</b>	12 - 13,5	110 12 000	111 12 000	110 12 400	111 12 400	100 12 510
<b>E 13,5</b>	13,5 - 15,5	110 13 000	111 13 000	110 13 400	111 13 400	100 13 510
<b>E 15,5</b>	15,5 - 17,5	110 15 000	111 15 000	110 15 400	111 15 400	100 15 510
<b>E 17,5</b>	17,5 - 19,5	110 17 000	111 17 000	110 17 400	111 17 400	110 17 510
<b>E 19,5</b>	19,5 - 21,5	110 19 000	111 19 000	110 19 400	111 19 400	110 19 510
<b>E 21,5</b>	21,5 - 24,5	110 21 000	111 21 000	110 21 400	111 21 400	100 21 510
<b>E 24,5</b>	24,5 - 27,5	110 24 000	111 24 000	110 24 400	111 24 400	100 24 510
<b>E 27,5</b>	27,5 - 31,5	110 27 000	111 27 000	110 27 400	111 27 400	100 27 510
<b>E 31,5</b>	31,5 - 37	110 31 000	111 31 000	110 31 400	111 31 400	100 31 510
<b>E 37</b>	37 - 45	110 37 000	111 37 000	110 37 400	111 37 400	100 37 510
<b>E 45</b>	45 - 55	110 45 000	111 45 000	110 45 400	111 45 400	100 45 510

\* Replacement blades are supplied in matched sets.

The blades are finish ground, so no grinding is required after the blades are inserted into the reamer body.

### Sets of Reamers Type E in Wooden Cases

Symbol	Range mm	Special Steel Part No.	Hard Chrome Part No.
<b>EA</b>	10,5 - 31,5	110 00 100	111 00 100
<b>ESO</b>	10,5 - 45	110 00 200	111 00 200



Type K



**Application Range**

The precision reamer for reaming of holes in line with each other. .  
The tapered guide sleeve holds the reamer in precise alignment with the holes.

**Description**

Right-hand cutting reamer with expanding blades.  
Parallel shank with square at the rear and integral pilot with tapered guide sleeve at the front of the reamer.  
Due to the unique Hunger relief grinding process the blades have a progressively increasing clearance angle giving a softer cutting action.  
From size K 12 the front adjusting nut is marked with a circumferential scale.  
One graduation of the scale corresponds to a 0,01 mm change in cutting diameter.

Size	Adjustment Range		Length Overall L1 mm	Length Blades L2 mm	Length Pilot L3 mm	Size of Square a mm	Number 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

Packaging of the reamers.

From size K 7 to K 37 individually in transparent packaging tubes.

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**

Type	Adjustment Range		Number 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

The blades of the standard reamers type K are made of a special steel with excellent cutting properties.

Hunger has also manufactured a "hard chrome" version in which the blades are coated with hard chrome. The hard chrome coating has a low coefficient of friction.

Hard chrome reamers are therefore particularly suitable for reaming materials with a high wear tendency and materials that tend to stick and form built-up edges.

Hard chrome reamers and hard chrome replacement blades have been discontinued. Remaining stocks of nearly all reamer sizes are available while supplies last.

As an advanced alternative to the hard chrome version, Hunger now offers the DLC version, in which the blades are coated with diamond-like carbon (DLC), See page 3 for details.

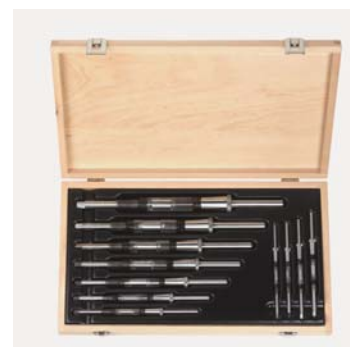
## Ordering Information

Size	Range ∅ mm	Reamers		Replacement Blades*		Spare Nuts Part No.	Spare Centering Cones Part No.
		Special Steel Part No.	Hard Chrome Part No.	Special Steel Part No.	Hard Chrome Part No.		
<b>K 7</b>	7 - 8	120 07 000	121 07 000	100 06 400	101 06 400	140 04 510	120 07 600
<b>K 8</b>	8 - 9	120 08 000	121 08 000	120 08 400	121 08 400	100 08 510	120 08 600
<b>K 9</b>	9 - 10	120 09 000	121 09 000	120 09 400	121 09 400	100 09 510	120 09 600
<b>K 10</b>	10 - 11	120 10 000	121 10 000	120 10 400	121 10 400	100 10 510	120 10 600
<b>K 11</b>	11 - 12	120 11 000	121 11 000	120 11 400	121 11 400	100 11 510	120 11 600
<b>K 12</b>	12 - 13,5	120 12 000	121 12 000	120 12 400	121 12 400	100 12 520	120 12 600
<b>K 13,5</b>	13,5 - 15,5	120 13 000	121 13 000	120 13 400	121 13 400	100 13 520	120 13 600
<b>K 15,5</b>	15,5 - 18	120 15 000	121 15 000	120 15 400	121 15 400	100 15 520	120 15 600
<b>K 18</b>	18 - 21	120 18 000	121 18 000	120 18 400	121 18 400	100 18 520	120 18 600
<b>K 21</b>	21 - 24	120 21 000	121 21 000	120 21 400	121 21 400	100 21 520	120 21 600
<b>K 24</b>	24 - 27,5	120 24 000	121 24 000	120 24 400	121 24 400	100 24 520	120 24 600
<b>K 27,5</b>	27,5 - 31,5	120 27 000	121 27 000	120 27 400	121 27 400	100 27 520	120 27 600
<b>K 31,5</b>	31,5 - 37	120 31 000	121 31 000	120 31 400	121 31 400	100 31 520	120 31 600
<b>K 37</b>	37 - 45	120 37 000	121 37 000	120 37 400	121 37 400	100 37 520	120 37 600
<b>K 45</b>	45 - 55	120 45 000	121 45 000	120 45 400	121 45 400	100 45 520	120 45 600
<b>K 55</b>	55 - 65	120 55 000	121 55 000	120 55 400	121 55 400	100 55 520	120 55 600
<b>K 65</b>	65 - 80	120 65 000	121 65 000	100 65 400	101 65 400	100 65 520	120 65 600
<b>K 80</b>	80 - 95	120 80 000	121 80 000	100 80 400	101 80 400	100 80 520	120 80 600
<b>K 95</b>	95 - 110	120 95 000	121 95 000	100 95 400	101 95 400	100 95 520	120 95 600

\*Replacement blades are supplied in matched sets.

## Sets of Reamers Type K in Wooden Cases

Symbol	Size Range mm	Special Steel Part No.	Hard Chrome Part No.
<b>KAN</b>	8 - 31,5	120 00 100	121 00 100
<b>KEN</b>	8 - 45	120 00 200	121 00 200



### Description

The blades of the reamers type K version DLC are coated with a diamond-like hard material layer, which is applied by a complex PVD process.

The DLC coating is characterized by extreme hardness, wear resistance and smoothness (very low friction).

At the same time, the sharpness of the cutting edges is maintained because the DLC coating is extremely thin.

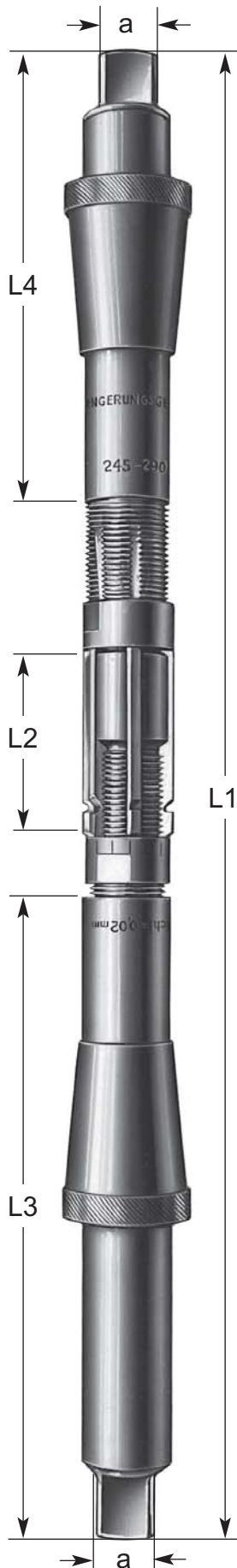
The DLC version of the reamers type K is therefore ideal for reaming aluminum alloys, titanium alloys, copper alloys (bronze and brass) as well as materials with a high wear effect and materials that tend to stick and form built-up edges.

### Ordering Information

Größe	Range ∅ mm	Reamer Type K Version DLC Artike-Nr.	Replacement Blades* Version DLC Artike-Nr.	Spare Nut Artike-Nr.	Spare Centering Cone
<b>K 7</b>	7 - 8	128 07 000	108 06 400	140 04 510	120 07 600
<b>K 8</b>	8 - 9	128 08 000	128 08 400	100 08 510	120 08 600
<b>K 9</b>	9 - 10	128 09 000	128 09 400	100 09 510	120 09 600
<b>K 10</b>	10 - 11	128 10 000	128 10 400	100 10 510	120 10 600
<b>K 11</b>	11 - 12	128 11 000	128 11 400	100 11 510	120 11 600
<b>K 12</b>	12 - 13,5	128 12 000	128 12 400	100 12 520	120 12 600
<b>K 13,5</b>	13,5 - 15,5	128 13 000	128 13 400	100 13 520	120 13 600
<b>K 15,5</b>	15,5 - 18	128 15 000	128 15 400	100 15 520	120 15 600
<b>K 18</b>	18 - 21	128 18 000	128 18 400	100 18 520	120 18 600
<b>K 21</b>	21 - 24	128 21 000	128 21 400	100 21 520	120 21 600
<b>K 24</b>	24 - 27,5	128 24 000	128 24 400	100 24 520	120 24 600
<b>K 27,5</b>	27,5 - 31,5	128 27 000	128 27 400	100 27 520	120 27 600
<b>K 31,5</b>	31,5 - 37	128 31 000	128 31 400	100 31 520	120 31 600
<b>K 37</b>	37 - 45	128 37 000	128 37 400	100 37 520	120 37 600
<b>K 45</b>	45 - 55	128 45 000	128 45 400	100 45 520	120 45 600
<b>K 55</b>	55 - 65	128 55 000	128 55 400	100 55 520	120 55 600
<b>K 65</b>	65 - 80	128 65 000	128 65 400	100 65 520	120 65 600
<b>K 80</b>	80 - 95	128 80 000	128 80 400	100 80 520	120 80 600
<b>K 95</b>	95 - 110	128 95 000	128 95 400	100 95 520	120 95 600

\* Replacement blades are supplied in matched sets.





### Application Range

The universal reamer for all types of holes, especially for inline reaming of two or more aligned holes.

Two tapered guide sleeves provide for precise alignment between the hole being reamed and the other mating hole.

### Description

Right-hand cutting reamer with expanding blades.

Interchangeable pilots on both the front and back of the reamer.

Each pilot has a square and a taper bush. A special bayonet coupling with mating cones between each pilot and the reamer body ensures proper alignment.

The blades are ground to provide a rough cut followed by finish reaming.

Due to the unique Hunger relief grinding process, the blades have a progressively increasing clearance angle, resulting in a softer cutting action.

The front adjusting nut is marked with a circumferential scale.

One graduation on the scale corresponds to a 0.01 mm change in cutting diameter.

Size	Adjustment Range mm	Length Overall L1 mm	Length Blades L2 mm	Length Pilot L 3 mm	Length Pilot L 4 mm	Size of Square a mm	Number of Blades	Weight kg
<b>U 12</b>	12 - 13,5	250	30	110	82	8	5	0,170
<b>U 13,5</b>	13,5 - 15,5	270	33	116	84	9	5	0,245
<b>U 15,5</b>	15,5 - 18	295	36	127	88	10	5	0,360
<b>U 18</b>	18 - 21	330	40	140	100	12	5	0,545
<b>U 19,5</b>	19,5 - 22,5	352	44	150	110	13	5	0,700
<b>U 21</b>	21 - 24,5	352	44	150	110	13	5	0,800
<b>U 24,5</b>	24,5 - 29	385	48	157	118	13	6	1,140
<b>U 29</b>	29 - 34	418	52	170	130	16	6	1,670
<b>U 34</b>	34 - 39	440	54	180	140	18	6	2,430
<b>U 39</b>	39 - 45	475	60	190	150	18	6	3,310
<b>U 45</b>	45 - 52	500	60	200	162	18	6	4,700
<b>U 52</b>	52 - 59	500	60	200	162	18	6	5,700
<b>U 59</b>	59 - 66	500	60	200	162	18	6	6,700

Packaging of the reamers.

From Size U 12 to U 39 individually in transparent packaging tubes.

From Size U 45 to U 59 individually in plastic nets.

### Boxed Sets of Reamers Type U

Type	Adjustment Range		Number of Reamers	Weight kg
	mm	Inches		
<b>USI</b>	12 - 34	$15/32 - 1 \frac{11}{32}$	7	6,700
<b>USE</b>	12 - 45	$15/32 - 1 \frac{49}{64}$	9	13,100



### Description

The blades of the standard reamers type U are made of a special steel with excellent cutting properties.

Hunger has also manufactured a "hard chrome" version in which the blades are coated with hard chrome. The hard chrome coating has a low coefficient of friction.

Hard chrome reamers are therefore particularly suitable for reaming materials with a high wear tendency and materials that tend to stick and form built-up edges.

Hard chrome reamers and hard chrome replacement blades have been discontinued. Remaining stocks of nearly all reamer sizes are available while supplies last.

As an advanced alternative to the hard chrome version, Hunger now offers the DLC version, in which the blades are coated with diamond-like carbon (DLC), See page 55 for details.

### Ordering Information

Size	Reamers		Replacement Blades*		Front Nut with Scale Part No.	Back Nut Part No.	Guide Sleeve Part No.
	Special Steel Part No.	Hard Chrome Part No.	Special Steel Part No.	Hard Chrome Part No.			
<b>U 12</b>	130 12 000	131 12 000	130 12 400	131 12 400	130 12 520	100 12 510	130 12 600
<b>U 13,5</b>	130 13 000	131 13 000	130 13 400	131 13 400	100 12 520	100 13 510	130 13 600
<b>U 15,5</b>	130 15 000	131 15 000	130 15 400	131 15 400	130 15 520	100 15 510	130 15 600
<b>U 18</b>	130 18 000	131 18 000	130 18 400	131 18 400	130 18 520	100 18 510	130 18 600
<b>U 19,5<sup>+</sup></b>	130 19 000	131 19 000	130 19 400	131 19 400	100 18 520	130 19 510	130 18 600
<b>U 21</b>	130 21 000	131 21 000	130 21 400	131 21 400	130 21 520	100 21 510	130 21 600
<b>U 24,5</b>	130 24 000	131 24 000	130 24 400	131 29 400	130 24 520	130 24 510	130 24 600
<b>U 29</b>	130 29 000	131 29 000	130 29 400	131 27 400	130 29 520	130 29 510	130 29 600
<b>U 34</b>	130 34 000	131 34 000	130 34 400	131 34 400	130 34 520	130 34 510	130 31 600
<b>U 39</b>	130 39 000	131 39 000	130 39 400	131 39 400	130 39 520	130 39 510	130 37 600
<b>U 45</b>	130 45 000	131 45 000	130 45 400	131 45 400	130 45 520	100 45 510	130 45 600
<b>U 52</b>	130 52 000	131 52 000	130 45 400	131 45 400	130 52 520	130 52 510	130 52 600
<b>U 59</b>	130 59 000	131 59 000	130 45 400	131 45 400	130 52 520	130 52 510	130 65 600

\*Replacement blades are supplied in matched sets.

The blades are finish ground, so no grinding is required after the blades are inserted into the reamer.

### Sets of Reamers Type U in Wooden Cases

Symbol	Size Range mm	Special Steel Part No.	Hard Chrome Part No.
<b>USI</b>	12 - 34	130 00 100	131 00 100
<b>USE</b>	12 - 45	130 00 200	131 00 200

<sup>+</sup>The intermediate size U 19,5 is not included in the sets.



### Description

The blades of the reamers type D version DLC are coated with a diamond-like hard material layer, which is applied by a complex PVD process.

The DLC coating is characterized by extreme hardness, wear resistance and smoothness (very low friction).

At the same time, the sharpness of the cutting edges is maintained because the DLC coating is extremely thin.

The DLC version of the reamers type is therefore ideal for reaming aluminum alloys, titanium alloys, copper alloys (bronze and brass) as well as materials with a high wear effect and materials that tend to stick and form built-up edges.

### Ordering Information

Size	Reamers Part No.	Replacement Blades* Special Steel Part No.	SpareFront Nut wish scale Part No.	Spare Back Nut Part No.	Spare Guide Sleeve Part No.
<b>U 12</b>	138 12 000	138 12 400	130 12 520	100 12 510	130 12 600
<b>U 13,5</b>	138 13 000	138 13 400	100 12 520	100 13 510	130 13 600
<b>U 15,5</b>	138 15 000	138 15 400	130 15 520	100 15 510	130 15 600
<b>U 18</b>	138 18 000	138 18 400	130 18 520	100 18 510	130 18 600
<b>U 19,5<sup>+</sup></b>	138 19 000	138 19 400	100 18 520	130 19 510	130 18 600
<b>U 21</b>	138 21 000	138 21 400	130 21 520	100 21 510	130 21 600
<b>U 24,5</b>	138 24 000	138 24 400	130 24 520	130 24 510	130 24 600
<b>U 29</b>	138 29 000	138 29 400	130 29 520	130 29 510	130 29 600
<b>U 34</b>	138 34 000	138 34 400	130 34 520	130 34 510	130 31 600
<b>U 39</b>	138 39 000	138 39 400	130 39 520	130 39 510	130 37 600
<b>U 45</b>	138 45 000	138 45 400	130 45 520	100 45 510	130 45 600
<b>U 52</b>	138 52 000	138 45 400	130 52 520	130 52 510	130 52 600
<b>U 59</b>	138 59 000	138 45 400	130 52 520	130 52 510	130 65 600

\* Replacement blades are supplied in matched sets.

**Type U Pilots**

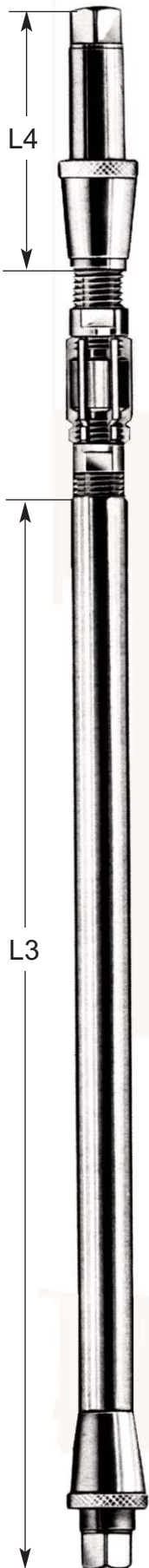
**Description**

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

The pilot and reamer body are interlocked by a bayonet type coupling. Since the mating tapers are usually tightly bonded, it is recommended that a plastic hammer be used to loosen the tight contact before removing the pilot from the reamer body.

Gently tap the pilot around the female cone.

With the contact loosened, rotate the pilot clockwise with respect to the reamer body until the triangular projection on the taper is centered in the recess in the female taper so that the pilot can be removed from the reamer body.

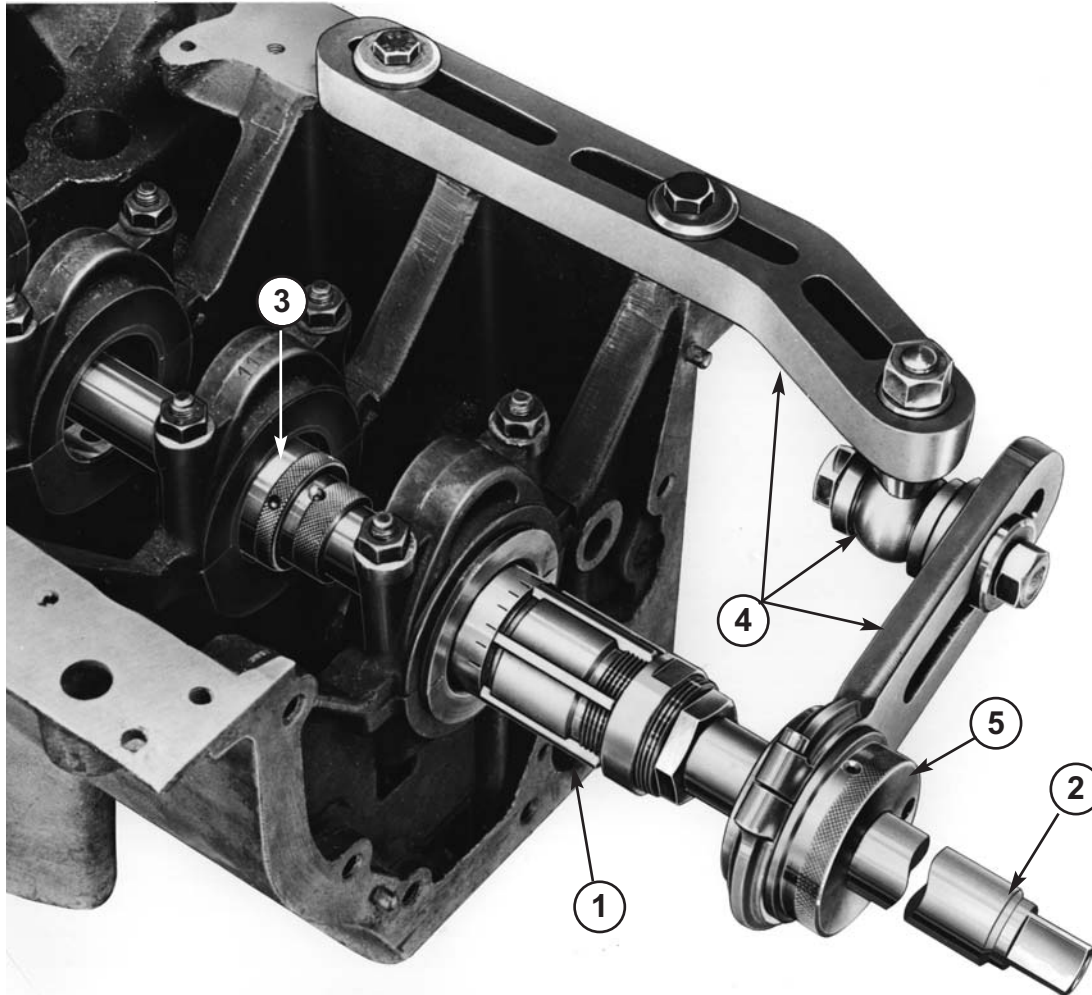


Size of Reamer	Standard Front Pilots		Standard Back Pilots		Extension Pilots Size I	
	Length L3 mm	Part No.	Length L4 mm	Part No.	Length mm	Part No.
<b>U 12</b>	110	130 12 701	82	130 12 702	210	132 12 711
<b>U 13,5</b>	116	130 13 701	84	130 13 702	220	132 13 712
<b>U 15,5</b>	127	130 15 701	88	130 15 702	230	132 15 713
<b>U 18</b>	140	130 18 701	100	130 18 702	240	132 18 714
<b>U 19,5</b>	150	130 19 701	110	130 19 702	250	132 19 715
<b>U 21</b>	150	130 21 701	110	130 21 702	250	132 21 715
<b>U 24,5</b>	157	130 24 701	118	130 24 702	260	132 24 716
<b>U 29</b>	170	130 29 701	130	130 29 702	270	132 29 717
<b>U 34</b>	180	130 34 701	140	130 34 702	280	132 34 718
<b>U 39</b>	190	130 39 701	150	130 39 702	290	132 39 719
<b>U 45</b>	200	130 45 701	162	130 45702	400	132 45 730
<b>U 52</b>	200	130 52 701	162	130 52 702	400	132 52 730
<b>U 59</b>	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.
<b>U 12</b>	410	132 12 731	610	132 12 751	810	132 12 771
<b>U 13,5</b>	420	132 13 732	620	132 13 752	820	132 13 772
<b>U 15,5</b>	430	132 15 733	630	132 15 753	830	132 15 773
<b>U 18</b>	440	132 18 734	640	132 18 754	840	132 18 774
<b>U 19,5</b>	450	132 19 735	650	132 19 755	-	-
<b>U 21</b>	450	132 21 735	650	132 21 755	850	132 21 775
<b>U 24,5</b>	460	132 24 736	660	132 24 756	860	132 24 776
<b>U 29</b>	470	132 29 737	670	132 29 757	870	132 29 777
<b>U 34</b>	480	132 34 738	680	132 34 758	880	132 34 778
<b>U 39</b>	490	132 39 739	690	132 39 759	890	132 39 779
<b>U 45</b>	600	132 45 750	800	132 45 770	900	132 45 780
<b>U 52</b>	600	132 52 750	800	132 52 770	900	132 52 780
<b>U 59</b>	600	132 52 750	800	132 52 770	900	132 52 780

Special length extension pilots available on request.

Line Reaming of holes  
from 36 to 110mm diameter



The components:

- ① Adjustable Reamer Type H
- ② Tool Bar
- ③ Expanding Tool Bar Guide
- ④ External Bearing Support
- ⑤ Plain Bearing Bush

Type H

**Application Range**

The reamer for reaming aligned holes, especially widely spaced holes

**Description**

Right-hand cutting shell reamer with adjustable blades and a through-hole for installing a tool bar (see page 57) for guiding and moving the reamer.

Adjustment is easily done with two round nuts which raise or lower the cutting blades by moving them along tapered seatings. The front nut is provided with a scale for ease of adjusting of the desired cutting diameter.

One graduation mark on the scale corresponds to a change in the cutting diameter of 0.02 mm.

A clamping spring screwed into the through-hole of the reamer ensures that the reamer is taken along when the tool bar is advanced and turned.

To place the reamer on the tool bar, slide the reamer onto and along the tool bar while at the same time rotating the reamer in direction of cut.

In case that a very rigid connection of the reamer to the tool bar is required, the clamping spring can be replaced by a clamping shell that locks the reamer to the tool bar.

Expandable guide bushes are available for insertion into the bores to align the tool bar in centerline with the bores.

See page 61 for more details.

An external bearing support is available for guiding the tool bar in front of a bore.

See page 62 for more details.

**Technical Details**



Size	Range Ø mm	Bore Ø d mm	Length Reamer L1 mm	Length Blades L2 mm	Nuts WAF mm	Blades Qty	Reamer 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	1,970
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

\* Adjustment of the nuts with hook wrench..



### Description

The blades of the standard reamers type H are made of a special steel with excellent cutting properties.

In addition to the standard "special steel" version with uncoated blades, Hunger has also a "hard chrome" version, in which the blades are coated with hard chrome.

The hard chrome coating has a low coefficient of friction.

Reamers in the "hard chrome" version are therefore particularly suitable for reaming materials with a high wear tendency and materials that tend to stick and form built-up edges.

The production of reamers with hard chrome coated blades and hard chrome coated spare blades has been discontinued.

Remaining stocks of almost all reamer sizes are still available while stocks last.

The "hard chrome" version is replaced by the advanced "DLC" version, in which the blades are coated with diamond-like carbon (DLC).

See page 60 for details.

### Ordering Information

Size	Reamer		Replacement Blades*		Spare Nut with Scale Part No.	Spare Clamping	
	Special Steel Part No.	Hard Chrome Part No.	Special Steel P/N	Hard Chrome Part No.		Spring Part No.	Shell Part No.
H 36	150 36 000	151 36 000	150 36 400	151 36 400	150 36 520	150 20 600	150 20 650
H 38	150 38 000	151 38 000	150 38 400	151 38 400	150 38 520	150 20 600	150 20 650
H 41	150 41 000	151 41 000	150 41 400	151 41 400	150 41 520	150 20 600	150 20 650
H 44	150 44 000	151 44 000	150 44 400	151 44 400	150 44 520	150 25 600	150 25 650
H 47	150 47 000	151 47 000	150 47 400	151 47 400	150 47 520	150 25 600	150 25 650
H 51	150 51 000	151 51 000	150 51 400	151 51 400	150 51 520	150 30 600	150 30 650
H 54	150 54 000	151 54 000	150 54 400	151 54 400	150 54 520	150 30 600	150 30 650
H 58	150 58 000	151 58 000	150 58 400	151 58 400	150 58 520	150 30 600	150 30 650
H 62	150 62 000	151 62 000	150 62 400	151 62 400	150 62 520	150 35 600	150 35 650
H 65	150 65 000	151 65 000	150 65 400	151 65 400	150 65 520	150 35 600	150 35 650
H 69	150 69 000	151 69 000	150 69 400	151 69 400	150 69 520	150 40 600	150 40 650
H 73	150 73 000	151 73 000	150 73 400	151 73 400	150 73 520	150 40 600	150 40 650
H 78	150 78 000	151 78 000	150 78 400	151 78 400	150 78 520	150 45 600	150 45 650
H 83	150 81 000	151 81 000	150 81 400	151 81 400	150 81 520	150 45 600	150 45 650
H 88	150 82 000	151 82 000	150 82 400	151 82 400	150 82 520	150 50 600	150 50 650
H 93	150 83 000	151 83 000	150 83 400	151 83 400	150 83 520	150 50 600	150 50 650
H 99	150 84 000	151 84 000	150 84 400	151 83 400	150 84 520	150 50 600	150 50 650
H 105	150 85 000	151 85 000	150 85 400	151 83 400	150 85 520	150 50 600	150 50 650

\*Replacement blades are supplied in matched sets.

The blades are finish ground, so no grinding is required after the blades are inserted into the reamer body.

## Description

The blades of the reamers type H version DLC are coated with a diamond-like hard material layer, which is applied in a complex PVD process.

The DLC coating is characterized by extreme hardness, wear resistance and smoothness (very low friction).

At the same time, the sharpness of the cutting edges is preserved because the DLC coating is extremely thin.

The DLC version of the reamers type H reamers is therefore ideal for reaming aluminum alloys, copper alloys (bronze and brass) as well as materials with a high wear effect and materials that tend to stick and form built-up edges

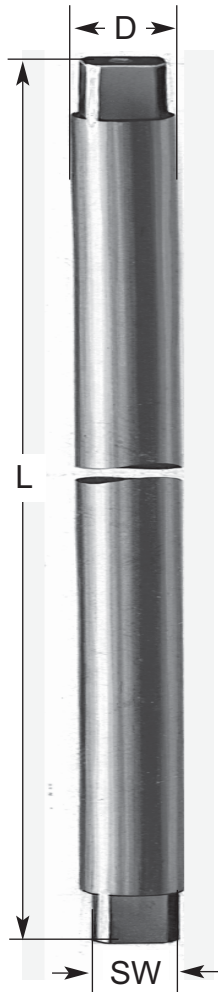
## Ordering Information

Size	Reamer DLC Part No.	Replacement Blades DLC Part No.	Spare Nut with scale Part No.	Spare Clamping	
				Spring Part No.	Shell Part No.
<b>H 36</b>	158 36 000	158 36 400	150 36 520	150 20 600	150 20 650
<b>H 38</b>	158 38 000	150 38 400	150 38 520	150 20 600	150 20 650
<b>H 41</b>	158 41 000	158 41 400	150 41 520	150 20 600	150 20 650
<b>H 44</b>	158 44 000	158 44 400	150 44 520	150 25 600	150 25 650
<b>H 47</b>	158 47 000	158 47 400	150 47 520	150 25 600	150 25 650
<b>H 51</b>	158 51 000	158 51 400	150 51 520	150 30 600	150 30 650
<b>H 54</b>	158 54 000	158 54 400	150 54 520	150 30 600	150 30 650
<b>H 58</b>	158 58 000	158 58 400	150 58 520	150 30 600	150 30 650
<b>H 62</b>	158 62 000	158 62 400	150 62 520	150 35 600	150 35 650
<b>H 65</b>	158 65 000	158 65 400	150 65 520	150 35 600	150 35 650
<b>H 69</b>	158 69 000	158 69 400	150 69 520	150 40 600	150 40 650
<b>H 73</b>	158 73 000	158 73 400	150 73 520	150 40 600	150 40 650
<b>H 78</b>	158 78 000	158 78 400	150 78 520	150 45 600	150 45 650
<b>H 83</b>	158 81 000	158 81 400	150 81 520	150 45 600	150 45 650
<b>H 88</b>	158 82 000	158 82 400	150 82 520	150 50 600	150 50 650
<b>H 93</b>	158 83 000	158 83 400	150 83 520	150 50 600	150 50 650
<b>H 99</b>	158 84 000	158 84 400	150 84 520	150 50 600	150 50 650
<b>H 105</b>	158 85 000	158 85 400	151 83 400	150 50 600	150 50 650

\* Replacement blades are supplied in matched sets.

The blades are finish ground, so no grinding is required after the blades are inserted into the reamer body.

## Tool Bars



### Application

A tool bar is required to guide the reamer

### Description

The tool bar has a square at each end to which a tap wrench can be attached to rotate and advance the reamer that is placed on the tool bar.

The tool bars are precision ground so that the reamer is guided precisely in every position along the tool bar.

### Ordering Information

Part No.	Tool Bar		Diameter D mm	Length L mm	WAF SW mm	Weight kg
	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

\* Customized tool bars are available in any desired length.

## Expandable Guide Bushes for the Tool Bars

### Application

The guide bush is clamped into one of the holes to keep the toolbar centered and aligned with the hole.

### Description

The guide bushes are equipped with clamping wedges that can be adjusted radially outward by means of an adjusting ring to clamp the guide bush in the bore.

### Order Information:



Size	Tool Bar Guides		Bore d mm	Expansion Range D mm	Weight kg
	Part No.	Suitable for Reamer Sizes			
EL20	153 20 000	H 36 - H 41	20	35,5 - 54	0,200
EL25	153 25 000	H 44 - H 47	25	43,5 - 62	0,300
EL30	153 30 000	H 51 - H 58	30	49,5 - 74	0,410
EL35	153 35 000	H 62 - H 65	35	61,5 - 83	0,620
EL40	153 40 000	H 69 - H 73	40	68,5 - 93	0,800
EL45	153 45 000	H 78 - H 83	45	77,5 - 105	1,100
EL50	153 50 000	H 88 - H 105	50	87,5 - 127	1,550



External Bearing Support

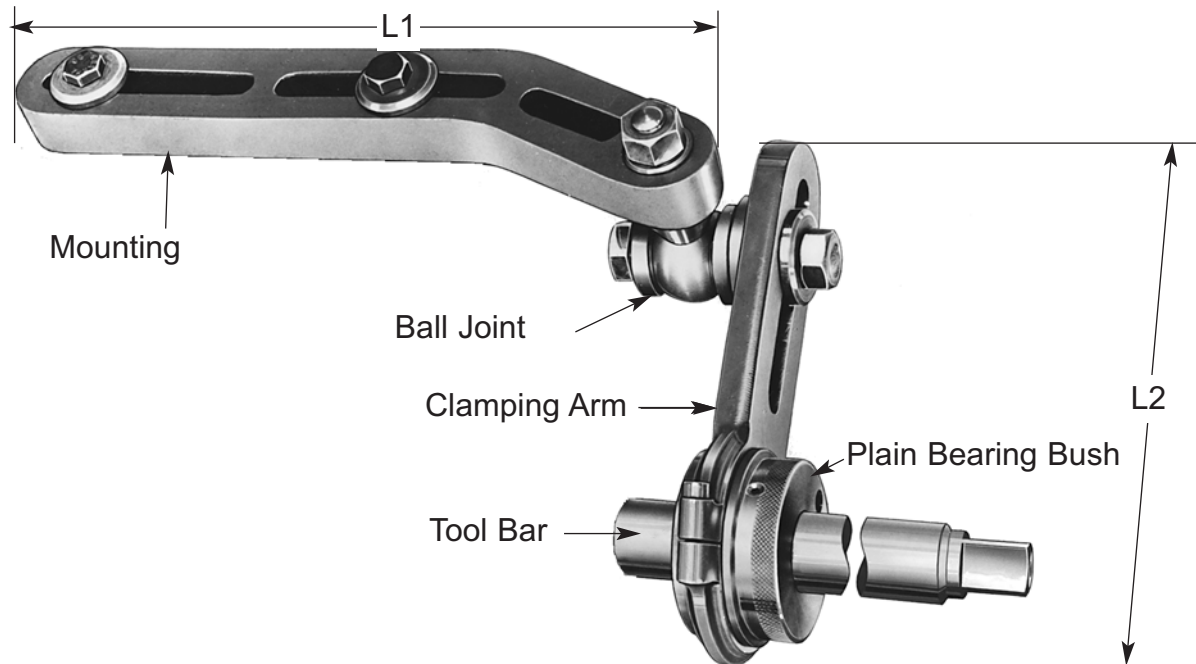
**Application**

The universal bearing support is designed to place a plain bearing bush in front of a hole for perfect alignment of the tool bar

**Description**

The plain bearing bush is locked into a clamp arm that is connected by a ball joint to a mounting base that is attached to the workpiece.

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



**Ordering Information**

Bearing Support			Components						
Size	P/N	Weight kg	Size	Mounting Base		Clamping Arm		Ball Joint	
				P/N	L1 mm	Size	P/N	L2 mm	P/N
IA	156 11 100	3,140	IA	156 11 110	330	IA	156 11 120	210	156 11 130
IIA1	156 12 102	5,100	IIA	156 12 110	400	IA	156 11 120	210	156 11 130

Plain Bearing Bushes for Clamping Arm			
Size	P/N	Suitable for Bar Diameter	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



**Valve Seat Refacing Machine  
Type VDS2E**

**for seat diameter 35 - 90 mm.**

Handy machine operated on protective low voltage to eliminate electric hazards. Two motors ensure a smooth cutting action.

Two cutting speeds are available to provide a flawless seating surface.

The machine is fitted with an exchangeable seat refacing head with built-in slideway for cutting tool travel to ensure a precise seat angle.

Further details on request.



**Valve Seat Refacing Machine  
Types VDS2.3E/VDS2.5HD**

**for seat diameter 35-110/140mm.**

Handy machine operated on protective low voltage to eliminate electric hazards.

Two motors ensure a smooth cutting action.

Two cutting speeds are available to provide a flawless seating surface.

The machine is fitted with an exchangeable seat refacing head with built-in slideway for cutting tool travel to ensure a precise seat angle.

Further details on request.



**Valve Seat Refacing Machine  
Types VD4HD**

**for seat diameter 60 - 250 mm.**

Heavy-duty machine operated on protective low voltage to eliminate electric hazards.

Two motors ensure a smooth cutting action.

Infinitely adjustable cutting speed is available to provide a flawless seating surface.

The machine is fitted with an exchangeable seat refacing head with built-in slideway for cutting tool travel to ensure a precise seat angle.

Further details on request.



**Valve Grinding Machine**

**Type VKM2.3M**

**Max. Chuck Capacity**

**32,5mm.**

Solid cast iron construction.  
Optional automated oscillation of valve face across grinding wheel.  
Optional self-centering steady rest for perfect alignment of long valves

Further details on request.



**Valve Grinding Machine**

**Type VKM3.1/3.4**

**Max. Chuck Capacity**

**32/40mm.**

Solid cast iron construction.  
Self centering steady rest for perfect alignment of long valves.

Further details on request.



**Valve Grinding Machine**

**Type VKM4A**

**Max. Chuck Capacity**

**40mm.**

Heavy-duty machine.  
Optional automated oscillation of valve face across grinding wheel.  
Optional self-centering steady rest for perfect alignment of long valves.

Optional automated infeed.

Further details on request.



**Counterboring Machine  
Type ADM4E  
for seat ring pockets  
from 67 to 250 mm diam.**

The motor drive unit of this is also part of the VD4E Valve Seat Refacing Machine and, therefore, the machine can be converted to a seat refacing machine by replacing the counterboring head by a seat refacing gear unit fitted with a seat refacing head.

Further details on request.



**Mobile Face Turning Machine  
Type RCM  
for diameter range 200 - 720 mm.**

The RCM is designed to resurface the cylinder liner landing surface on the engine block and the cylinder liner landing surface on the cylinder head

Further details on request.



**Mobile Honing Machine  
Type PHM  
for honing cylinder liners  
from 150 to- 640 mm diam.**

Designed for honing the cylinder liners of large diesel and gas engines

Further details on request.