





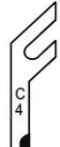


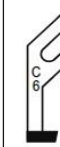




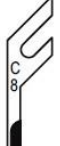
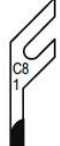
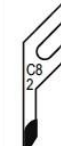


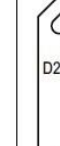
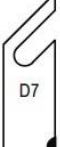



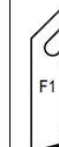
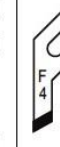
| LUDWIG HUNGER MÜNCHEN   |  | VDS1A   | - 9 - |
|---|--|---------|-------|
|   |  | Cutters |       |
| <p>Cutters of different length, width and cutting geometry are available to cut valve seats of different size, shape and location.</p>  |  |         |       |
| <p><b>1. Cutters for seat refacing and correction</b></p>   |  |         |       |
|   |  |         |       |
| <p>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.</p>                   |  |         |       |
| <p><b>2. Cutters for seat refacing only</b></p>   |  |         |       |
|   |  |         |       |
| <p>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.</p>   |  |         |       |
| <p><b>3. Cutters for correction only</b></p>  |  |         |       |
|   |  |         |       |
| <p>This type of cutter is designed for correcting only. The angle of correction is defined by the proper inclination of the cutting edge. Cutters 24, 24M, 30, C42, C82, E, E2, F, F1, F4, F5, F10, G and H belong to this type of cutters.</p> |  |         |       |
| <p><b>4. Cutters for cutting grooves</b></p>  |  |         |       |
|   |  |         |       |
| <p>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.</p>                                  |  |         |       |





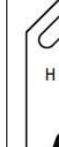
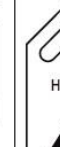
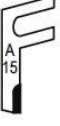
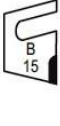

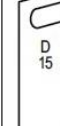

| LUDWIG HUNGER MÜNCHEN  |             | VDS1A                         | - 12 -      |            |            |            |
|--|-------------|-------------------------------|-------------|------------|------------|------------|
|  |             | Cutters                       |             |            |            |            |
| <p><b>Cutters for 45°, 30°, 35°, 25° and 20° adapter heads</b></p> |             |                               |             |            |            |            |
| <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 correction  | 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 correction  | 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   |             |                               |             |            |            |            |




| LUDWIG HUNGER MÜNCHEN  |                           | VDS1A                | - 13 -     |            |            |                   |
|--|---------------------------|----------------------|------------|------------|------------|-------------------|
|  |                           | Cutters              |            |            |            |                   |
| <p><b>Cutters for 45°, 30°, 35°, 25° and 20° adapter heads</b></p> |                           |                      |            |            |            |                   |
| <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 correction  | 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 correction  | 80°                       | 75°                  | 60°        |            |            | 58°               |
| Seat location  | recessed                  | recessed             | recessed   | recessed   | recessed   | recessed          |
| Application  | Ford Renault              | Saab                 | Mercedes   |            | Mercedes   | Mazda Suzuki      |
| Drawn to scale   |                           |                      |            |            |            |                   |

| LUDWIG HUNGER MÜNCHEN  |                  | VDS1A                 | - 14 -                         |            |                     |                     |
|--|------------------|-----------------------|--------------------------------|------------|---------------------|---------------------|
|  |                  | Cutters               |                                |            |                     |                     |
| <p><b>Cutters for 45°, 30°, 35°, 25° and 20° adapter heads</b></p> |                  |                       |                                |            |                     |                     |
| <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 correction  | 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 correction  | -                | 60°                   | 60°                            | 60°        | 60°                 |                     |
| Seat location  | recessed         | recessed              | recessed                       | recessed   | recessed            |                     |
| Application  | Mercedes Porsche | Porsche               | Porsche                        | Porsche    | BMW                 |                     |
| Drawn to scale   |                  |                       |                                |            |                     |                     |

| LUDWIG HUNGER MÜNCHEN                                       |   | VDS1A   |   | - 15 -  |   |   |
|---|---|---|---|---|---|---|
|   |   | Cutters   |   |   |   |   |
| <b>Cutters for 45°, 30°, 35°, 25° und 20° adapter heads</b> |   |   |   |   |   |   |
| <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 corrector  | -   | -   | -   | -   | -   | -   |
| 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 corrector  | -   | -   | 60°   | -   | -   | -   |
| Seat location   | recessed  | recessed  | recessed  | universal   | universal   | recessed  |
| Application   | Opel<br>Renault<br>Volvo  | universal   | universal   | cutting<br>grooves  | cutting<br>grooves  | Mot.cycles  |
| Drawn to scale  |  |  |  |  |  |  |

| - 16 -  |   | VDS1A  |  | LUDWIG HUNGER MÜNCHEN  |  |  |
|---|---|--|--|--|--|--|
|   |   | Cutters  |  |  |  |  |
| <b>Cutters for 45°, 30°, 35°, 25° und 20° adapter heads</b> |   |  |  |  |  |  |
| <b>Type</b>   | <b>C8</b>   | <b>C8-1</b>  | <b>C8-2</b>  | <b>C9</b>  | <b>D</b>   | <b>D2</b>  |
| Order-No.   | 216 69 212  | 216 69 213   | 216 69 214   | 216 69 413   | 216 61 230   | 216 61 431   |
| for seat dia. mm  | 17 - 37   | 17 - 37  | 12 - 30  | 14 - 34  | 34 - 54  | 24 - 44  |
| Refacing seats  | Ja  | Ja   | no   | Ja   | Ja   | Ja   |
| Top correction  | 15°   | 30°  | -  | -  | -  | -  |
| Bottom corrector  | -   | -  | 60°  | -  | -  | -  |
| Seat location   | recessed  | recessed   | recessed   | recessed   | recessed   | recessed   |
| Application   | Mazda<br>Toyota<br>Mot.cycles   | universal  | universal  | universal  | universal  | universal  |
| Drawn to scale  |   |   |   |   |   |   |
| <b>Type</b>   | <b>D7</b>   | <b>E</b>   | <b>E2</b>  | <b>F</b>   | <b>F1</b>  | <b>F4</b>  |
| Order-No.   | 216 61 232  | 216 62 150   | 216 62 160   | 216 62 210   | 216 62 230   | 216 62 610   |
| for seat dia. mm  | 38 - 58   | 20 - 52  | 35 - 52  | 20 - 37  | 35 - 52  | 20 - 37  |
| Refacing seats  | Ja  | no   | no   | no   | no   | no   |
| Top correction  | -   | 15°  | 0°   | 15°  | 15°  | 30°  |
| Bottom corrector  | -   | -  | 60°  | -  | -  | -  |
| Seat location   | recessed  | recessed   | recessed   | recessed   | recessed   | surface  |
| Application   | universal   | universal  | universal  | universal<br>Ford<br>Lada  | universal  | universal  |
| Drawn to scale  |  |  |  |  |  |  |

| LUDWIG HUNGER MÜNCHEN                                       |   | VDS1A   |   | - 17 -  |   |   |
|---|---|---|---|---|---|---|
|   |   | Cutters   |   |   |   |   |
| <b>Cutters for 45°, 30°, 35°, 25° und 20° adapter heads</b> |   |   |   |   |   |   |
| <b>Type</b>   | <b>F5</b>   | <b>F10</b>  | <b>G</b>  | <b>G0</b>   | <b>H</b>  | <b>H1</b>   |
| 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 corrector  | -   | -   | 75°   | 75°   | 75°   | 60°   |
| Seat location   | recessed  | recessed  | universal   | universal   | universal   | universal   |
| Application   | universal   | Harley<br>Porsche   | universal   | universal   | universal   | Harley  |
| Drawn to scale  |  |  |  |  |  |  |
| <b>Cutters for 15° adapter head</b>                         |   |   |   |   |   |   |
| <b>Type</b>   | <b>A/15</b>   | <b>B/15</b>   | <b>C/15</b>   | <b>D/15</b>   | <b>D1/15</b>  |   |
| 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  |  |  |  |  |  |   |

| - 18 -   |   | VDS1A   |   | LUDWIG HUNGER MÜNCHEN |  |
|--|---|---|---|-----------------------|--|
|  |   | Cutters   |   |                       |  |
| <b>Cutters for 45°, 30°, 35°, 25° und 20° adapter heads</b>  |   |   |   |                       |  |
| <b>SC Cutters with indexable inserts<br/>for hard seats</b>  |   |   |   |                       |  |
| The SC type cutters are furnished with indexable carbide inserts.<br>The indexable inserts are coated with TIN and are specifically provided for cutting the hard seat materials as used in modern engines.<br>If the insert is too dull or chipped, index insert or install a new insert. |   |   |   |                       |  |
| <b>Type</b>  | <b>SC1</b>  | <b>SC2</b>  | <b>SC5</b>  |                       |  |
| Part No.   | 216 65 110  | 216 65 100  | 216 65 120  |                       |  |
| For seat dia. mm   | 23 - 43   | 28 - 48   | 40 - 60   |                       |  |
| Seat refacing  | yes   | yes   | yes   |                       |  |
| Top correction   | -   | -   | -   |                       |  |
| Bottom corrector   | -   | -   | -   |                       |  |
| Seat location  | surface & recessed  | surface & recessed  | surface & recessed  |                       |  |
| Application  | universal   | universal   | universal<br>Harley   |                       |  |
| Drawn to scale   |  |  |  |                       |  |
| Scope of supply:   | Part No.  | Part No.  | Part No.  |                       |  |
| Cutter   | 216 65 110  | 216 65 100  | 216 65 120  |                       |  |
| consisting of  |   |   |   |                       |  |
| Toolholder   | 216 65 001  | 216 65 002  | 216 65 003  |                       |  |
| Cutting insert   | 862 20 004  | 862 20 003  | 862 20 003  |                       |  |
| Clamping screw   | 809 71 026  | 809 71 025  | 809 71 025  |                       |  |
| Torx screwdriver   | 863 22 002  | 863 22 001  | 863 22 001  |                       |  |