

# Static Toolholders DIN 69880

**WTO**

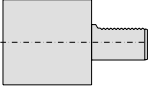
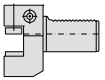
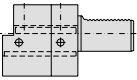
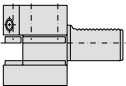
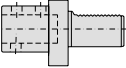
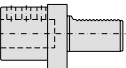
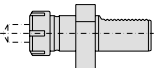

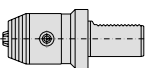
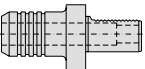
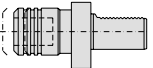
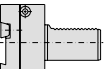
Driven  
Precision  
Tools

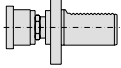
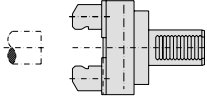



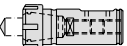



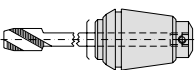

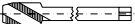
ISO 9001

*Higher Productivity Pays.*

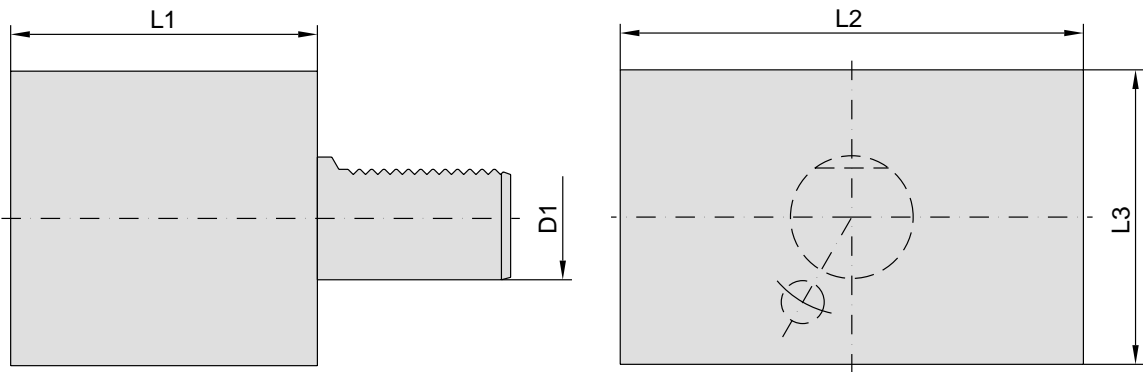


**High Precision and Rigidity**

|   |                                    |                                    |       |                   |
|---|------------------------------------|------------------------------------|-------|-------------------|
|    | <b>48-A...</b>                     | Toolholder Blank                   | A1-A2 | <b>Page 5</b>     |
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|   |                                  |  |    |                     |
|---|----------------------------------|--|----|---------------------|
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|     | <b>48-ST...</b>                  | Bar Puller                             |    | <b>Page 22</b>      |
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|  | <b>1900...</b><br><b>1901...</b> | Collets                                |    | <b>Page 29</b>      |
|  |                                  | Tap Dimensions                         |    | <b>Page 30</b>      |

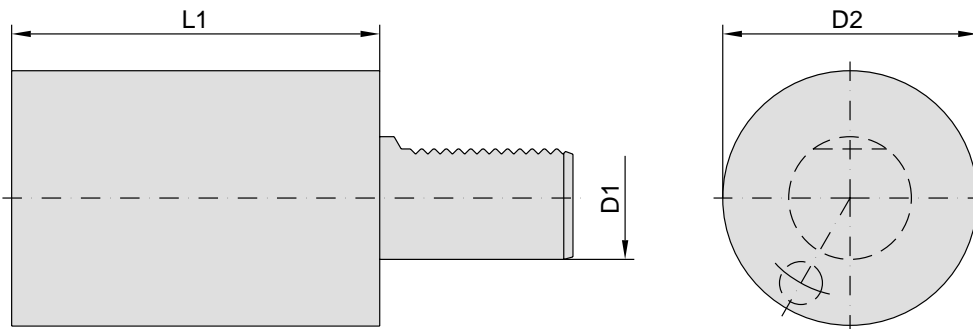
## Toolholder Blank, rectangular, Form A1



### 48-A1-...

| Item No.            | D1 | L1  | L2  | L3  |
|---------------------|----|-----|-----|-----|
| <b>48-A1-16x44</b>  | 16 | 44  | 78  | 44  |
| <b>48-A1-20x65</b>  | 20 | 65  | 100 | 60  |
| <b>48-A1-25x75</b>  | 25 | 75  | 100 | 60  |
| <b>48-A1-30x85</b>  | 30 | 85  | 130 | 76  |
| <b>48-A1-40x100</b> | 40 | 100 | 151 | 96  |
| <b>48-A1-50x125</b> | 50 | 125 | 160 | 120 |
| <b>48-A1-60x160</b> | 60 | 160 | 165 | 125 |

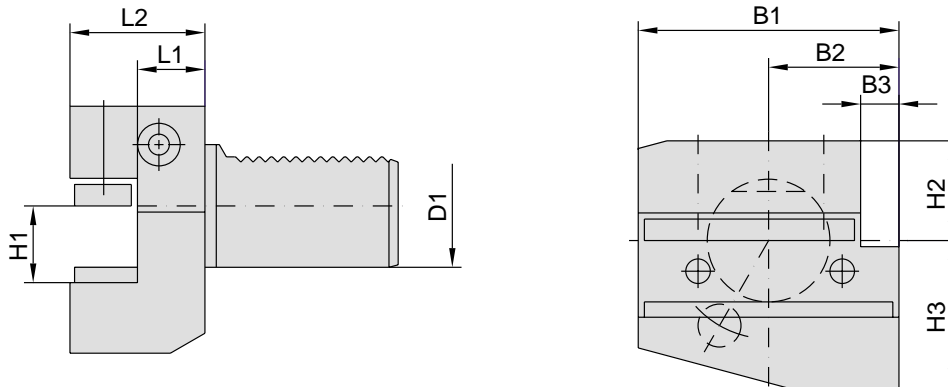
## Toolholder Blank, round, Form A2



### 48-A2-...

| Item No.            | D1 | D2  | L1  |
|---------------------|----|-----|-----|
| <b>48-A2-16x60</b>  | 16 | 40  | 60  |
| <b>48-A2-20x70</b>  | 20 | 50  | 70  |
| <b>48-A2-25x80</b>  | 25 | 58  | 80  |
| <b>48-A2-25x200</b> | 25 | 58  | 200 |
| <b>48-A2-30x100</b> | 30 | 68  | 100 |
| <b>48-A2-30x240</b> | 30 | 68  | 240 |
| <b>48-A2-40x120</b> | 40 | 83  | 120 |
| <b>48-A2-40x320</b> | 40 | 83  | 320 |
| <b>48-A2-50x135</b> | 50 | 98  | 135 |
| <b>48-A2-50x400</b> | 50 | 98  | 400 |
| <b>48-A2-60x150</b> | 60 | 123 | 150 |
| <b>48-A2-60x480</b> | 60 | 123 | 480 |

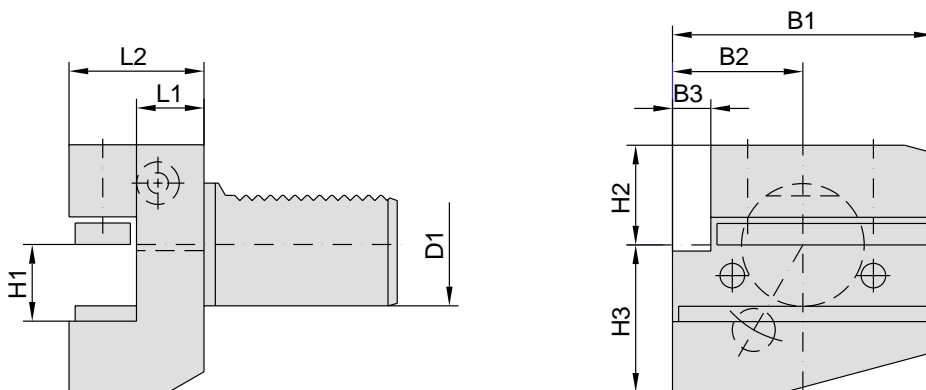
## Radial Square Toolholder, right hand, short, Form B1



### 48-B1-...

| Item No.       | D1 | H1    | B1  | B2   | B3   | H2   | H3   | L1 | L2 |
|----------------|----|-------|-----|------|------|------|------|----|----|
| 48-B1-16x12    | 16 | 12    | 42  | 23   | 5    | 20   | 22   | 13 | 24 |
| 48-B1-16x12x34 | 16 | 12    | 42  | 23   | 5    | 20   | 22   | 23 | 34 |
| 48-B1-20x16    | 20 | 16/12 | 55  | 30   | 7    | 25   | 30   | 16 | 30 |
| 48-B1-20x16x40 | 20 | 16/12 | 55  | 30   | 7    | 25   | 30   | 26 | 40 |
| 48-B1-25x16    | 25 | 16/12 | 55  | 30   | 7    | 25   | 30   | 16 | 30 |
| 48-B1-25x16x40 | 25 | 16/12 | 55  | 30   | 7    | 25   | 30   | 26 | 40 |
| 48-B1-30x20    | 30 | 20/16 | 70  | 35   | 10   | 28   | 38   | 22 | 40 |
| 48-B1-30x20x60 | 30 | 20/16 | 70  | 35   | 10   | 28   | 38   | 42 | 60 |
| 48-B1-40x25    | 40 | 25/20 | 85  | 42.5 | 12.5 | 32.5 | 48   | 22 | 44 |
| 48-B1-50x32    | 50 | 32/25 | 100 | 50   | 16   | 35   | 60   | 30 | 55 |
| 48-B1-60x32    | 60 | 32/25 | 125 | 62.5 | 16   | 42.5 | 62.5 | 30 | 60 |

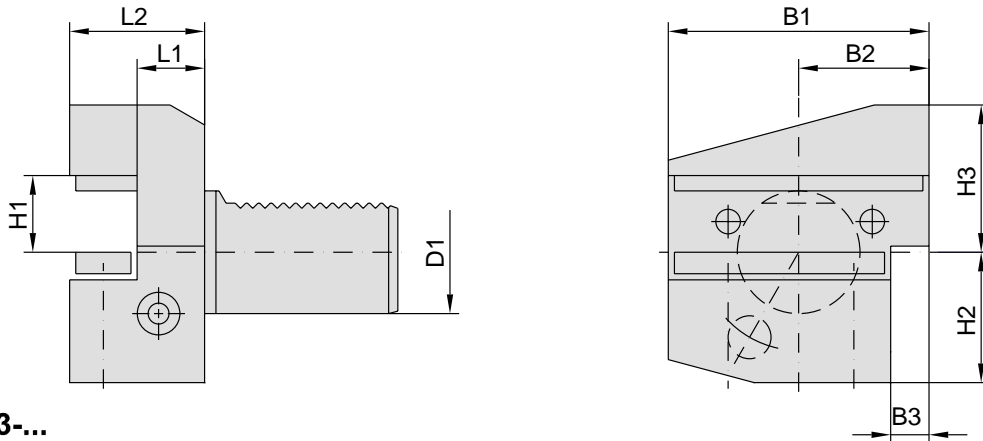
## Radial Square Toolholder, left hand, short, Form B2



### 48-B2-...

| Item No.       | D1 | H1    | B1  | B2   | B3   | H2   | H3   | L1 | L2 |
|----------------|----|-------|-----|------|------|------|------|----|----|
| 48-B2-16x12    | 16 | 12    | 42  | 23   | 5    | 20   | 22   | 13 | 24 |
| 48-B2-16x12x34 | 16 | 12    | 42  | 23   | 5    | 20   | 22   | 23 | 34 |
| 48-B2-20x16    | 20 | 16/12 | 55  | 30   | 7    | 25   | 30   | 16 | 30 |
| 48-B2-20x16x40 | 20 | 16/12 | 55  | 30   | 7    | 25   | 30   | 26 | 40 |
| 48-B2-25x16    | 25 | 16/12 | 55  | 30   | 7    | 25   | 30   | 16 | 30 |
| 48-B2-25x16x40 | 25 | 16/12 | 55  | 30   | 7    | 25   | 30   | 26 | 40 |
| 48-B2-30x20    | 30 | 20/16 | 70  | 35   | 10   | 28   | 38   | 22 | 40 |
| 48-B2-30x20x60 | 30 | 20/16 | 70  | 35   | 10   | 28   | 38   | 42 | 60 |
| 48-B2-40x25    | 40 | 25/20 | 85  | 42.5 | 12.5 | 32.5 | 48   | 22 | 44 |
| 48-B2-50x32    | 50 | 32/25 | 100 | 50   | 16   | 35   | 60   | 30 | 55 |
| 48-B2-60x32    | 60 | 32/25 | 125 | 62.5 | 16   | 42.5 | 62.5 | 30 | 60 |

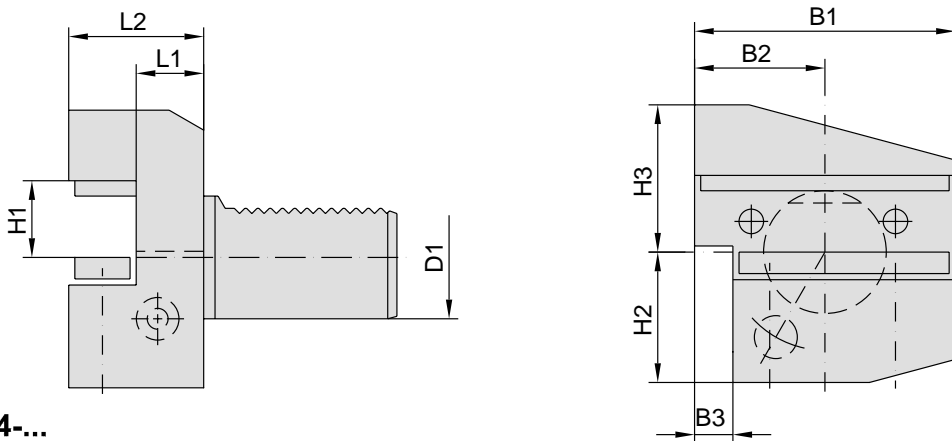
## Radial Square Toolholder, right hand inverted, short, **Form B3**



### 48-B3-...

| Item No.       | D1 | H1    | B1  | B2   | B3   | H2   | H3   | L1 | L2 |
|----------------|----|-------|-----|------|------|------|------|----|----|
| 48-B3-16x12    | 16 | 12    | 42  | 23   | 5    | 20   | 22   | 13 | 24 |
| 48-B3-16x12x34 | 16 | 12    | 42  | 23   | 5    | 20   | 22   | 23 | 34 |
| 48-B3-20x16    | 20 | 16/12 | 55  | 30   | 7    | 25   | 30   | 16 | 30 |
| 48-B3-20x16x40 | 20 | 16/12 | 55  | 30   | 7    | 25   | 30   | 26 | 40 |
| 48-B3-25x16    | 25 | 16/12 | 55  | 30   | 7    | 25   | 30   | 16 | 30 |
| 48-B3-25x16x40 | 25 | 16/12 | 55  | 30   | 7    | 25   | 30   | 26 | 40 |
| 48-B3-30x20    | 30 | 20/16 | 70  | 35   | 10   | 35   | 38   | 22 | 40 |
| 48-B3-30x20x60 | 30 | 20/16 | 70  | 35   | 10   | 35   | 38   | 42 | 60 |
| 48-B3-40x25    | 40 | 25/20 | 85  | 42.5 | 12.5 | 42.5 | 48   | 22 | 44 |
| 48-B3-50x32    | 50 | 32/25 | 100 | 50   | 16   | 50   | 60   | 30 | 55 |
| 48-B3-60x32    | 60 | 32/25 | 125 | 62.5 | 16   | 62.5 | 62.5 | 30 | 60 |

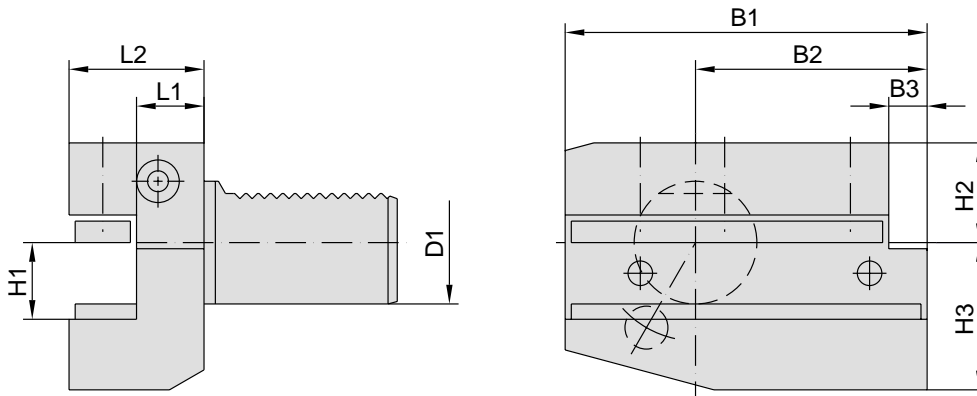
## Radial Square Toolholder, left hand inverted, short, **Form B4**



### 48-B4-...

| Item No.       | D1 | H1    | B1  | B2   | B3   | H2   | H3   | L1 | L2 |
|----------------|----|-------|-----|------|------|------|------|----|----|
| 48-B4-16x12    | 16 | 12    | 42  | 23   | 5    | 20   | 22   | 13 | 24 |
| 48-B4-16x12x34 | 16 | 12    | 42  | 23   | 5    | 20   | 22   | 23 | 34 |
| 48-B4-20x16    | 20 | 16/12 | 55  | 30   | 7    | 25   | 30   | 16 | 30 |
| 48-B4-20x16x40 | 20 | 16/12 | 55  | 30   | 7    | 25   | 30   | 26 | 40 |
| 48-B4-25x16    | 25 | 16/12 | 55  | 30   | 7    | 25   | 30   | 16 | 30 |
| 48-B4-25x16x40 | 25 | 16/12 | 55  | 30   | 7    | 25   | 30   | 26 | 40 |
| 48-B4-30x20    | 30 | 20/16 | 70  | 35   | 10   | 35   | 38   | 22 | 40 |
| 48-B4-30x20x60 | 30 | 20/16 | 70  | 35   | 10   | 35   | 38   | 42 | 60 |
| 48-B4-40x25    | 40 | 25/20 | 85  | 42.5 | 12.5 | 42.5 | 48   | 22 | 44 |
| 48-B4-50x32    | 50 | 32/25 | 100 | 50   | 16   | 50   | 60   | 30 | 55 |
| 48-B4-60x32    | 60 | 32/25 | 125 | 62.5 | 16   | 62.5 | 62.5 | 30 | 60 |

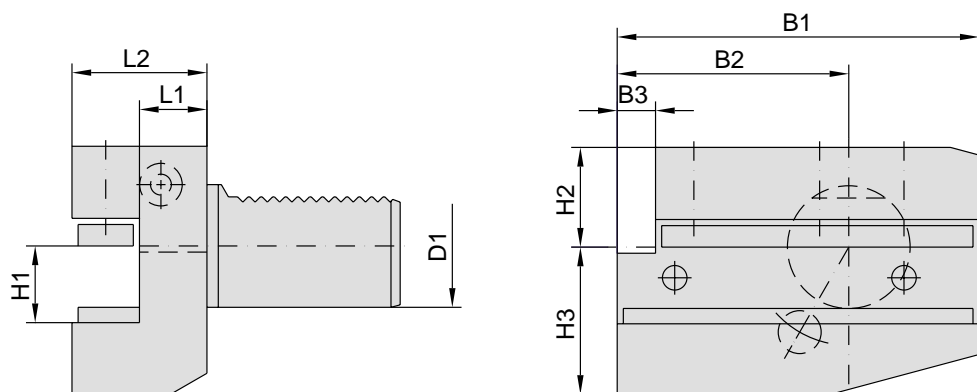
## Radial Square Toolholder, right hand, long, Form B5



### 48-B5-...

| Item No.       | D1 | H1    | B1  | B2   | B3   | H2   | H3   | L1 | L2 |
|----------------|----|-------|-----|------|------|------|------|----|----|
| 48-B5-16x12    | 16 | 12    | 58  | 39   | 5    | 20   | 22   | 13 | 24 |
| 48-B5-16x12x34 | 16 | 12    | 58  | 39   | 5    | 20   | 22   | 23 | 34 |
| 48-B5-20x16    | 20 | 16/12 | 75  | 50   | 7    | 25   | 30   | 16 | 30 |
| 48-B5-20x16x40 | 20 | 16/12 | 75  | 50   | 7    | 25   | 30   | 26 | 40 |
| 48-B5-25x16    | 25 | 16/12 | 75  | 50   | 7    | 25   | 30   | 16 | 30 |
| 48-B5-25x16x40 | 25 | 16/12 | 75  | 50   | 7    | 25   | 30   | 26 | 40 |
| 48-B5-30x20    | 30 | 20/16 | 100 | 65   | 10   | 28   | 38   | 22 | 40 |
| 48-B5-30x20x60 | 30 | 20/16 | 100 | 65   | 10   | 28   | 38   | 42 | 60 |
| 48-B5-40x25    | 40 | 25/20 | 118 | 75.5 | 12.5 | 32.5 | 48   | 22 | 44 |
| 48-B5-50x32    | 50 | 32/25 | 130 | 80   | 16   | 35   | 60   | 30 | 55 |
| 48-B5-60x32    | 60 | 32/25 | 145 | 82.5 | 16   | 42.5 | 62.5 | 30 | 60 |

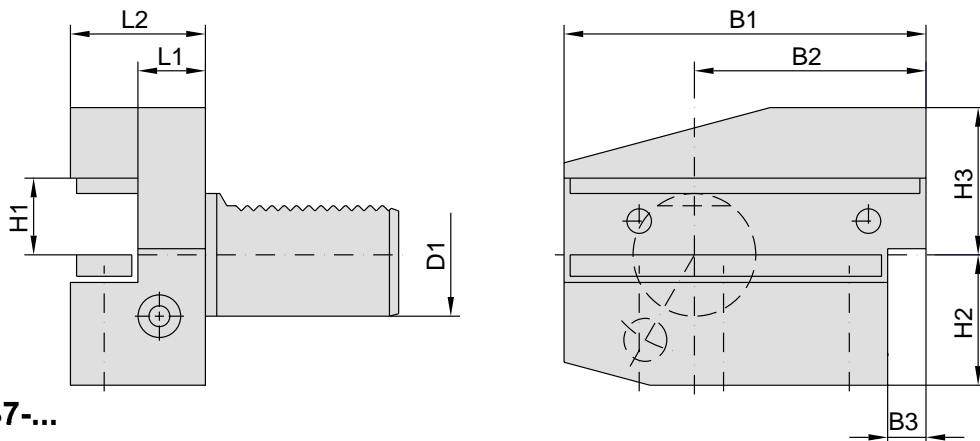
## Radial Square Toolholder, left hand, long, Form B6



### 48-B6-...

| Item No.       | D1 | H1    | B1  | B2   | B3   | H2   | H3   | L1 | L2 |
|----------------|----|-------|-----|------|------|------|------|----|----|
| 48-B6-16x12    | 16 | 12    | 58  | 39   | 5    | 20   | 22   | 13 | 24 |
| 48-B6-16x12x34 | 16 | 12    | 58  | 39   | 5    | 20   | 22   | 23 | 34 |
| 48-B6-20x16    | 20 | 16/12 | 75  | 50   | 7    | 25   | 30   | 16 | 30 |
| 48-B6-20x16x40 | 20 | 16/12 | 75  | 50   | 7    | 25   | 30   | 26 | 40 |
| 48-B6-25x16    | 25 | 16/12 | 75  | 50   | 7    | 25   | 30   | 16 | 30 |
| 48-B6-25x16x40 | 25 | 16/12 | 75  | 50   | 7    | 25   | 30   | 26 | 40 |
| 48-B6-30x20    | 30 | 20/16 | 100 | 65   | 10   | 28   | 38   | 22 | 40 |
| 48-B6-30x20x60 | 30 | 20/16 | 100 | 65   | 10   | 28   | 38   | 42 | 60 |
| 48-B6-40x25    | 40 | 25/20 | 118 | 75.5 | 12.5 | 32.5 | 48   | 22 | 44 |
| 48-B6-50x32    | 50 | 32/25 | 130 | 80   | 16   | 35   | 60   | 30 | 55 |
| 48-B6-60x32    | 60 | 32/25 | 145 | 82.5 | 16   | 42.5 | 62.5 | 30 | 60 |

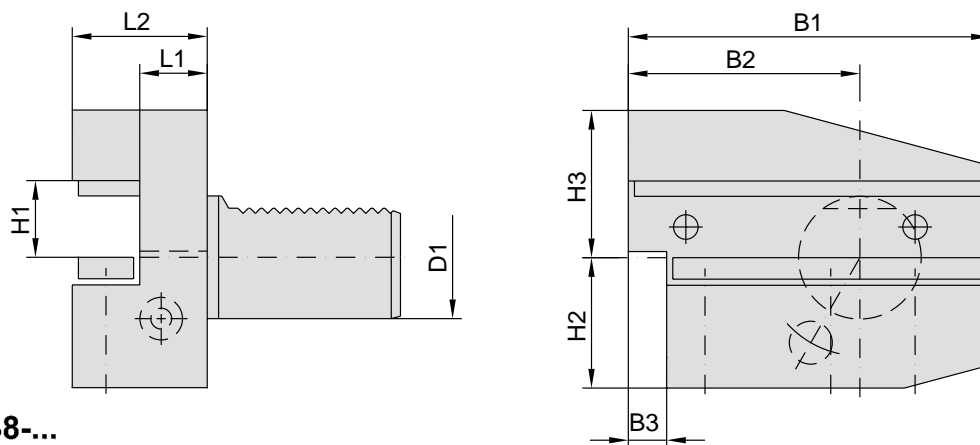
Radial Square Toolholder, right hand inverted, long, **Form B7**



48-B7-...

| Item No.       | D1 | H1    | B1  | B2   | B3   | H2   | H3   | L1 | L2 |
|----------------|----|-------|-----|------|------|------|------|----|----|
| 48-B7-16x12    | 16 | 12    | 58  | 39   | 5    | 20   | 22   | 13 | 24 |
| 48-B7-16x12x34 | 16 | 12    | 58  | 39   | 5    | 20   | 22   | 23 | 34 |
| 48-B7-20x16    | 20 | 16/12 | 75  | 50   | 7    | 25   | 30   | 16 | 30 |
| 48-B7-20x16x40 | 20 | 16/12 | 75  | 50   | 7    | 25   | 30   | 26 | 40 |
| 48-B7-25x16    | 25 | 16/12 | 75  | 50   | 7    | 25   | 30   | 16 | 30 |
| 48-B7-25x16x40 | 25 | 16/12 | 75  | 50   | 7    | 25   | 30   | 26 | 40 |
| 48-B7-30x20    | 30 | 20/16 | 100 | 65   | 10   | 35   | 38   | 22 | 40 |
| 48-B7-30x20x60 | 30 | 20/16 | 100 | 65   | 10   | 35   | 38   | 42 | 60 |
| 48-B7-40x25    | 40 | 25/20 | 118 | 75.5 | 12.5 | 42.5 | 48   | 22 | 44 |
| 48-B7-50x32    | 50 | 32/25 | 130 | 80   | 16   | 50   | 60   | 30 | 55 |
| 48-B7-60x32    | 60 | 32/25 | 145 | 82.5 | 16   | 62.5 | 62.5 | 30 | 60 |

Radial Square Toolholder, left hand inverted, long, **Form B8**

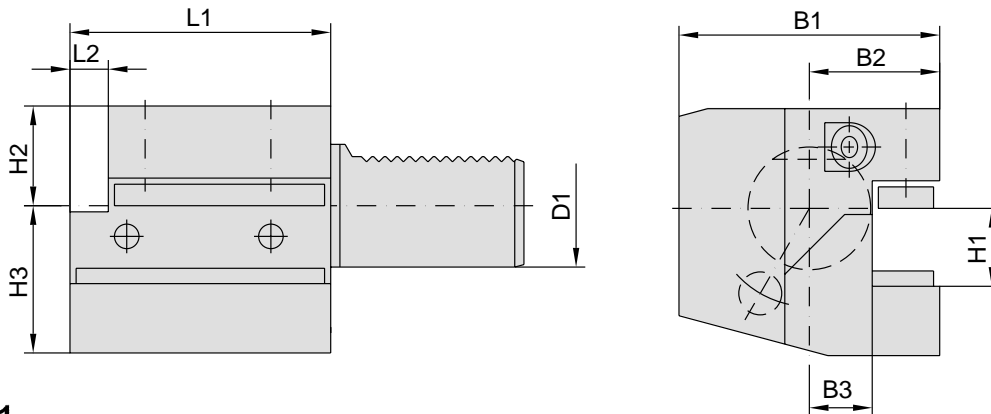


48-B8-...

| Item No.       | D1 | H1    | B1  | B2   | B3   | H2   | H3   | L1 | L2 |
|----------------|----|-------|-----|------|------|------|------|----|----|
| 48-B8-16x12    | 16 | 12    | 58  | 39   | 5    | 20   | 22   | 13 | 24 |
| 48-B8-16x12x34 | 16 | 12    | 58  | 39   | 5    | 20   | 22   | 23 | 34 |
| 48-B8-20x16    | 20 | 16/12 | 75  | 50   | 7    | 25   | 30   | 16 | 30 |
| 48-B8-20x16x40 | 20 | 16/12 | 75  | 50   | 7    | 25   | 30   | 26 | 40 |
| 48-B8-25x16    | 25 | 16/12 | 75  | 50   | 7    | 25   | 30   | 16 | 30 |
| 48-B8-25x16x40 | 25 | 16/12 | 75  | 50   | 7    | 25   | 30   | 26 | 40 |
| 48-B8-30x20    | 30 | 20/16 | 100 | 65   | 10   | 35   | 38   | 22 | 40 |
| 48-B8-30x20x60 | 30 | 20/16 | 100 | 65   | 10   | 35   | 38   | 42 | 60 |
| 48-B8-40x25    | 40 | 25/20 | 118 | 75.5 | 12.5 | 42.5 | 48   | 22 | 44 |
| 48-B8-50x32    | 50 | 32/25 | 130 | 80   | 16   | 50   | 60   | 30 | 55 |
| 48-B8-60x32    | 60 | 32/25 | 145 | 82.5 | 16   | 62.5 | 62.5 | 30 | 60 |



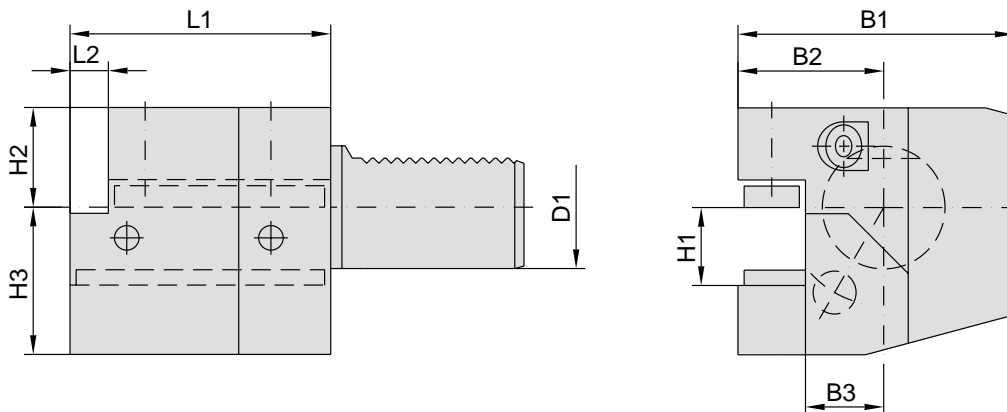
## Axial Square Toolholder, right hand, Form C1



### 48-C1-...

| Item No.    | D1 | H1    | B1  | B2   | B3 | H2   | H3   | L1  | L2   |
|-------------|----|-------|-----|------|----|------|------|-----|------|
| 48-C1-16x12 | 16 | 12    | 43  | 24   | 13 | 20   | 22   | 44  | 5    |
| 48-C1-20x16 | 20 | 16/12 | 65  | 40   | 26 | 25   | 30   | 50  | -    |
| 48-C1-25x16 | 25 | 16/12 | 58  | 33   | 19 | 25   | 30   | 55  | 7    |
| 48-C1-30x20 | 30 | 20/16 | 70  | 35   | 17 | 28   | 38   | 70  | 10   |
| 48-C1-40x25 | 40 | 25/20 | 85  | 42.5 | 21 | 32.5 | 48   | 85  | 12.5 |
| 48-C1-50x32 | 50 | 32/25 | 100 | 50   | 26 | 35   | 60   | 100 | 16   |
| 48-C1-60x32 | 60 | 32/25 | 125 | 62.5 | 33 | 42.5 | 62.5 | 125 | 16   |

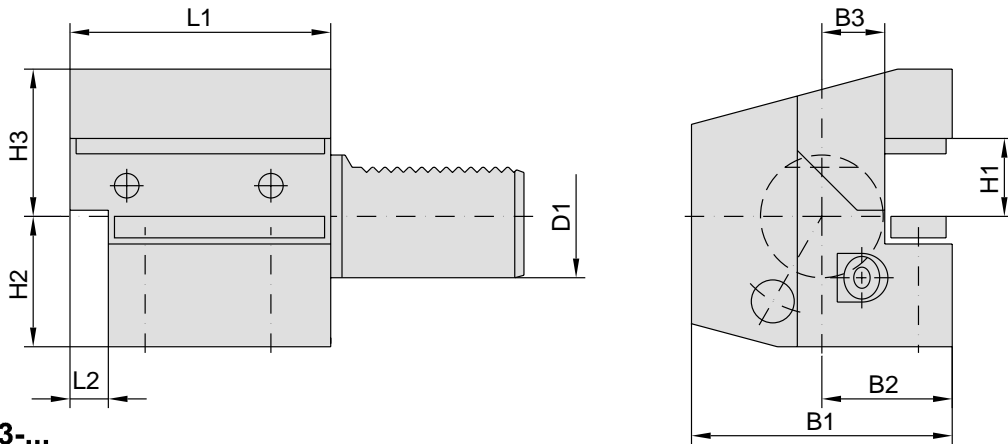
## Axial Square Toolholder, left hand, Form C2



### 48-C2-...

| Item No.    | D1 | H1    | B1  | B2   | B3   | H2   | H3   | L1  | L2   |
|-------------|----|-------|-----|------|------|------|------|-----|------|
| 48-C2-16x12 | 16 | 12    | 43  | 24   | 13   | 20   | 22   | 44  | 5    |
| 48-C2-20x16 | 20 | 16/12 | 65  | 40   | 26   | 25   | 30   | 50  | -    |
| 48-C2-25x16 | 25 | 16/12 | 58  | 33   | 19   | 25   | 30   | 55  | 7    |
| 48-C2-30x20 | 30 | 20/16 | 76  | 41   | 23   | 28   | 38   | 70  | 10   |
| 48-C2-40x25 | 40 | 25/20 | 90  | 47.5 | 25.5 | 32.5 | 48   | 85  | 12.5 |
| 48-C2-50x32 | 50 | 32/25 | 105 | 55   | 30.5 | 35   | 60   | 100 | 16   |
| 48-C2-60x32 | 60 | 32/25 | 125 | 62.5 | 33   | 42.5 | 62.5 | 125 | 16   |

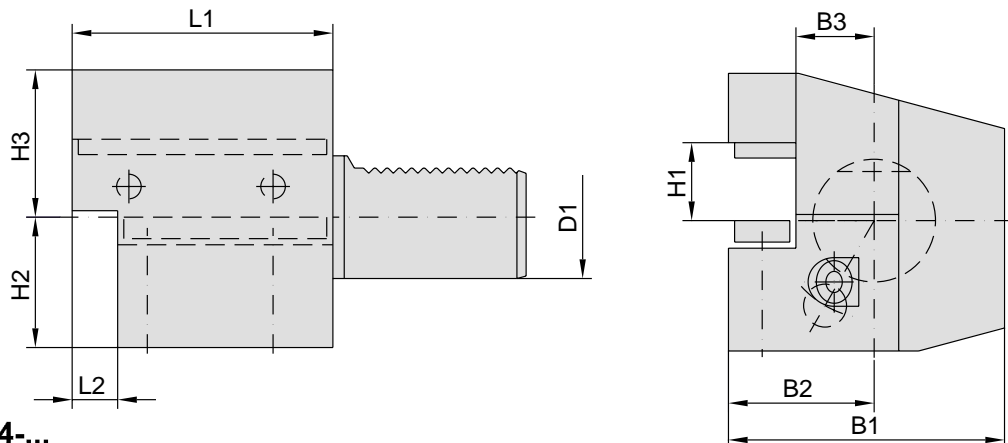
Axial Square Toolholder, right hand inverted, **Form C3**



**48-C3-...**

| Item No.    | D1 | H1    | B1  | B2   | B3 | H2   | H3   | L1  | L2   |
|-------------|----|-------|-----|------|----|------|------|-----|------|
| 48-C3-16x12 | 16 | 12    | 43  | 24   | 13 | 20   | 22   | 44  | 5    |
| 48-C3-20x16 | 20 | 16/12 | 65  | 40   | 26 | 25   | 30   | 50  | -    |
| 48-C3-25x16 | 25 | 16/12 | 58  | 33   | 19 | 25   | 30   | 55  | 7    |
| 48-C3-30x20 | 30 | 20/16 | 70  | 35   | 17 | 35   | 38   | 70  | 10   |
| 48-C3-40x25 | 40 | 25/20 | 85  | 42.5 | 21 | 42.5 | 48   | 85  | 12.5 |
| 48-C3-50x32 | 50 | 32/25 | 100 | 50   | 26 | 50   | 60   | 100 | 16   |
| 48-C3-60x32 | 60 | 32/25 | 125 | 62.5 | 33 | 62.5 | 62.5 | 125 | 16   |

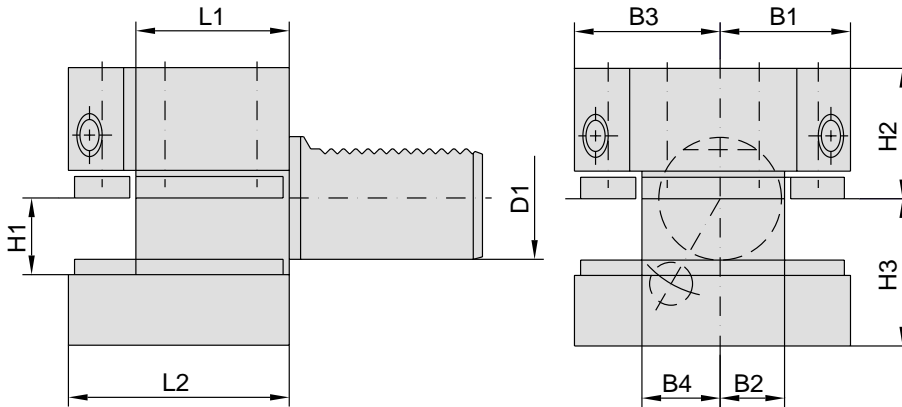
Axial Square Toolholder, left hand inverted, **Form C4**



**48-C4-...**

| Item No.    | D1 | H1    | B1  | B2   | B3   | H2   | H3   | L1  | L2   |
|-------------|----|-------|-----|------|------|------|------|-----|------|
| 48-C4-16x12 | 16 | 12    | 43  | 24   | 13   | 20   | 22   | 44  | 5    |
| 48-C4-20x16 | 20 | 16/12 | 65  | 40   | 26   | 25   | 30   | 50  | -    |
| 48-C4-25x16 | 25 | 16/12 | 58  | 33   | 19   | 25   | 30   | 55  | 7    |
| 48-C4-30x20 | 30 | 20/16 | 76  | 41   | 23   | 35   | 38   | 70  | 10   |
| 48-C4-40x25 | 40 | 25/20 | 90  | 47.5 | 25.5 | 42.5 | 48   | 85  | 12.5 |
| 48-C4-50x32 | 50 | 32/25 | 105 | 55   | 30.5 | 50   | 60   | 100 | 16   |
| 48-C4-60x32 | 60 | 32/25 | 125 | 62.5 | 33   | 62.5 | 62.5 | 125 | 16   |

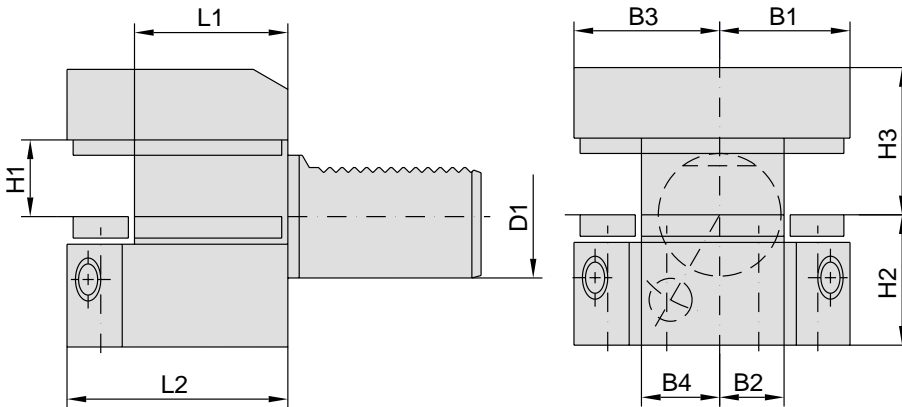
## Universal Square Toolholder, Form D1



### 48-D1-...

| Item No.    | D1 | H1    | B1   | B2 | B3   | B4   | H2   | H3   | L1 | L2  |
|-------------|----|-------|------|----|------|------|------|------|----|-----|
| 48-D1-25x16 | 25 | 16/12 | 33   | 19 | 33   | 19   | 25   | 30   | 34 | 48  |
| 48-D1-30x20 | 30 | 20/16 | 35   | 17 | 41   | 23   | 28   | 38   | 42 | 60  |
| 48-D1-40x25 | 40 | 25/20 | 42.5 | 21 | 47.5 | 25.5 | 32.5 | 48   | 50 | 72  |
| 48-D1-50x32 | 50 | 32/25 | 50   | 26 | 55   | 30.5 | 35   | 60   | 60 | 85  |
| 48-D1-60x32 | 60 | 32/25 | 57.5 | 33 | 57.5 | 33   | 42.5 | 62.5 | 85 | 110 |

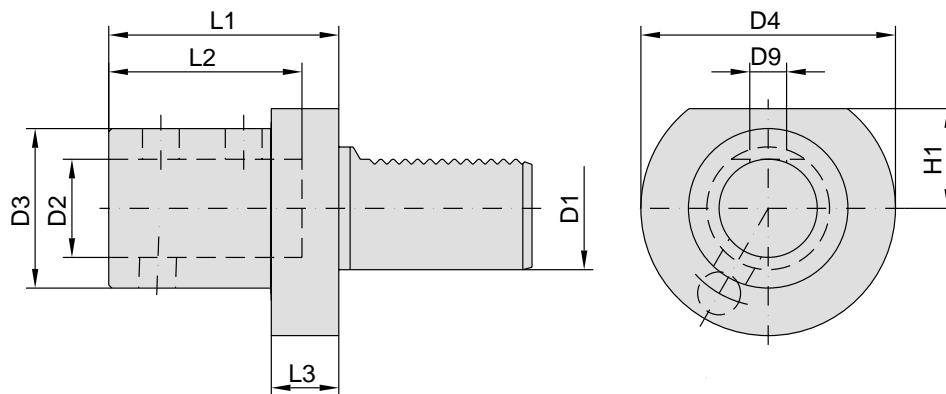
## Universal Square Toolholder, inverted, Form D2



### 48-D2-...

| Item No.    | D1 | H1    | B1   | B2 | B3   | B4   | H2   | H3   | L1 | L2  |
|-------------|----|-------|------|----|------|------|------|------|----|-----|
| 48-D2-25x16 | 25 | 16/12 | 33   | 19 | 33   | 19   | 25   | 30   | 34 | 48  |
| 48-D2-30x20 | 30 | 20/16 | 35   | 17 | 41   | 23   | 35   | 38   | 42 | 60  |
| 48-D2-40x25 | 40 | 25/20 | 42.5 | 21 | 47.5 | 25.5 | 42.5 | 48   | 50 | 72  |
| 48-D2-50x32 | 50 | 32/25 | 50   | 26 | 55   | 30.5 | 50   | 60   | 60 | 85  |
| 48-D2-60x32 | 60 | 32/25 | 57.5 | 33 | 57.5 | 33   | 62.5 | 62.5 | 85 | 110 |

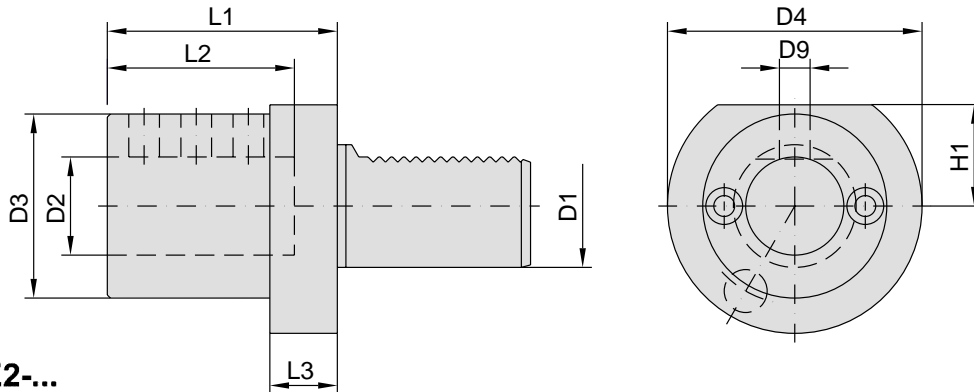
Holder for Indexable Insert Drills, internal coolant supply, **Form E1**



## 48-E1-...

| Item No.    | D1 | D2 | D3 | D4  | H1   | L1  | L2 | L3 | D9       |
|-------------|----|----|----|-----|------|-----|----|----|----------|
| 48-E1-20x16 | 20 | 16 | 36 | 50  | -    | 67  | 54 | 18 | M10x1x11 |
| 48-E1-20x20 | 20 | 20 | 40 | 50  | -    | 67  | 54 | 18 | M10x1x11 |
| 48-E1-20x25 | 20 | 25 | 45 | 50  | -    | 71  | 59 | 18 | M12x1x12 |
| 48-E1-25x16 | 25 | 16 | 36 | 58  | 25   | 67  | 54 | 18 | M10x1x11 |
| 48-E1-25x20 | 25 | 20 | 40 | 58  | 25   | 67  | 54 | 18 | M10x1x11 |
| 48-E1-25x25 | 25 | 25 | 45 | 58  | 25   | 71  | 59 | 18 | M12x1x12 |
| 48-E1-25x32 | 25 | 32 | 52 | 58  | 25   | 75  | 63 | 18 | M12x1x12 |
| 48-E1-30x16 | 30 | 16 | 36 | 68  | 28   | 67  | 54 | 22 | M10x1x11 |
| 48-E1-30x20 | 30 | 20 | 40 | 68  | 28   | 67  | 54 | 22 | M10x1x11 |
| 48-E1-30x25 | 30 | 25 | 45 | 68  | 28   | 71  | 59 | 22 | M12x1x12 |
| 48-E1-30x32 | 30 | 32 | 52 | 68  | 28   | 75  | 63 | 22 | M12x1x12 |
| 48-E1-40x16 | 40 | 16 | 36 | 83  | 32.5 | 67  | 54 | 22 | M10x1x11 |
| 48-E1-40x20 | 40 | 20 | 40 | 83  | 32.5 | 67  | 54 | 22 | M10x1x11 |
| 48-E1-40x25 | 40 | 25 | 45 | 83  | 32.5 | 75  | 59 | 22 | M12x1x12 |
| 48-E1-40x32 | 40 | 32 | 52 | 83  | 32.5 | 75  | 63 | 22 | M12x1x12 |
| 48-E1-40x40 | 40 | 40 | 65 | 83  | 32.5 | 90  | 73 | 22 | M16x1x13 |
| 48-E1-50x16 | 50 | 16 | 36 | 98  | 35   | 80  | 54 | 30 | M10x1x11 |
| 48-E1-50x20 | 50 | 20 | 40 | 98  | 35   | 80  | 54 | 30 | M10x1x11 |
| 48-E1-50x25 | 50 | 25 | 45 | 98  | 35   | 80  | 59 | 30 | M12x1x12 |
| 48-E1-50x32 | 50 | 32 | 52 | 98  | 35   | 80  | 63 | 30 | M12x1x12 |
| 48-E1-50x40 | 50 | 40 | 65 | 98  | 35   | 90  | 73 | 30 | M16x1x13 |
| 48-E1-50x50 | 50 | 50 | 75 | 98  | 35   | 100 | 83 | 30 | M16x1x13 |
| 48-E1-60x16 | 60 | 16 | 36 | 123 | 42.5 | 80  | 54 | 30 | M10x1x11 |
| 48-E1-60x20 | 60 | 20 | 40 | 123 | 42.5 | 80  | 54 | 30 | M10x1x11 |
| 48-E1-60x25 | 60 | 25 | 45 | 123 | 42.5 | 80  | 59 | 30 | M12x1x12 |
| 48-E1-60x32 | 60 | 32 | 52 | 123 | 42.5 | 80  | 63 | 30 | M12x1x12 |
| 48-E1-60x40 | 60 | 40 | 65 | 123 | 42.5 | 90  | 73 | 30 | M16x1x13 |
| 48-E1-60x50 | 60 | 50 | 75 | 123 | 42.5 | 100 | 83 | 30 | M16x1x13 |

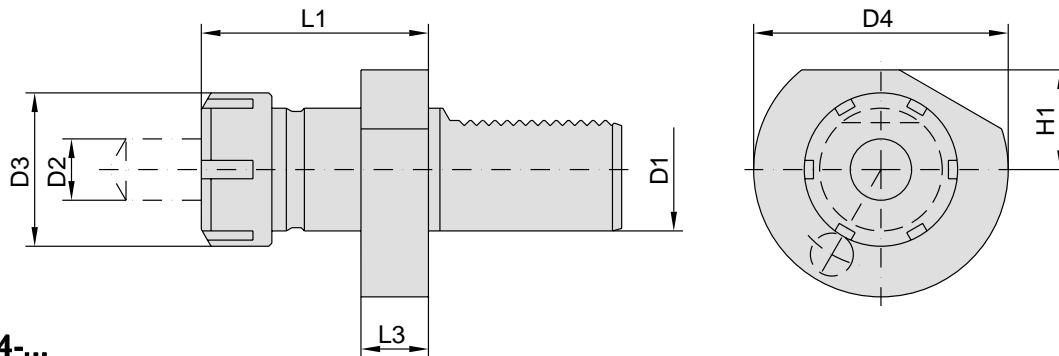
## Boring Bar Holder, internal and external coolant supply, Form E2



48-E2-...

| Item No.    | D1 | D2 | D3 | D4  | H1   | L1  | L2 | L3 | D9     |
|-------------|----|----|----|-----|------|-----|----|----|--------|
| 48-E2-16x6  | 16 | 6  | 32 | 40  | 18   | 44  | 34 | 13 | M6x16  |
| 48-E2-16x8  | 16 | 8  | 32 | 40  | 18   | 44  | 34 | 13 | M6x12  |
| 48-E2-16x10 | 16 | 10 | 32 | 40  | 18   | 44  | 34 | 13 | M6x12  |
| 48-E2-16x12 | 16 | 12 | 40 | 40  | 18   | 44  | 34 | 13 | M8x12  |
| 48-E2-16x16 | 16 | 16 | 40 | 40  | 18   | 44  | 34 | 13 | M8x12  |
| 48-E2-20x8  | 20 | 8  | 40 | 50  | 23   | 50  | 42 | 18 | M6x16  |
| 48-E2-20x10 | 20 | 10 | 40 | 50  | 23   | 50  | 42 | 18 | M8x16  |
| 48-E2-20x12 | 20 | 12 | 40 | 50  | 23   | 50  | 42 | 18 | M8x16  |
| 48-E2-20x16 | 20 | 16 | 40 | 50  | 23   | 50  | 42 | 18 | M8x12  |
| 48-E2-20x20 | 20 | 20 | 49 | 50  | 23   | 50  | 42 | 18 | M8x12  |
| 48-E2-20x25 | 20 | 25 | 49 | 50  | 23   | 60  | 52 | 18 | M8x10  |
| 48-E2-25x8  | 25 | 8  | 40 | 58  | 25   | 50  | 41 | 18 | M6x25  |
| 48-E2-25x10 | 25 | 10 | 40 | 58  | 25   | 50  | 41 | 18 | M6x25  |
| 48-E2-25x12 | 25 | 12 | 40 | 58  | 25   | 50  | 41 | 18 | M8x16  |
| 48-E2-25x16 | 25 | 16 | 40 | 58  | 25   | 50  | 41 | 18 | M8x16  |
| 48-E2-25x20 | 25 | 20 | 58 | 58  | 25   | 50  | 41 | 18 | M8x16  |
| 48-E2-25x25 | 25 | 25 | 58 | 58  | 25   | 60  | 51 | 18 | M8x16  |
| 48-E2-30x8  | 30 | 8  | 55 | 68  | 28   | 60  | 43 | 22 | M6x25  |
| 48-E2-30x10 | 30 | 10 | 55 | 68  | 28   | 60  | 43 | 22 | M6x25  |
| 48-E2-30x12 | 30 | 12 | 55 | 68  | 28   | 60  | 43 | 22 | M8x20  |
| 48-E2-30x16 | 30 | 16 | 55 | 68  | 28   | 60  | 54 | 22 | M8x20  |
| 48-E2-30x20 | 30 | 20 | 55 | 68  | 28   | 60  | 54 | 22 | M8x20  |
| 48-E2-30x25 | 30 | 25 | 55 | 68  | 28   | 60  | 54 | 22 | M8x16  |
| 48-E2-30x30 | 30 | 30 | 67 | 68  | 28   | 75  | 61 | 22 | M8x16  |
| 48-E2-30x32 | 30 | 32 | 67 | 68  | 28   | 75  | 61 | 22 | M8x16  |
| 48-E2-40x8  | 40 | 8  | 55 | 83  | 32.5 | 75  | 43 | 22 | M8x25  |
| 48-E2-40x10 | 40 | 10 | 55 | 83  | 32.5 | 75  | 43 | 22 | M8x25  |
| 48-E2-40x12 | 40 | 12 | 55 | 83  | 32.5 | 75  | 58 | 22 | M8x25  |
| 48-E2-40x16 | 40 | 16 | 55 | 83  | 32.5 | 75  | 61 | 22 | M10x25 |
| 48-E2-40x20 | 40 | 20 | 55 | 83  | 32.5 | 75  | 61 | 22 | M10x20 |
| 48-E2-40x25 | 40 | 25 | 55 | 83  | 32.5 | 75  | 61 | 22 | M10x20 |
| 48-E2-40x30 | 40 | 30 | 82 | 83  | 32.5 | 75  | 61 | 22 | M10x20 |
| 48-E2-40x32 | 40 | 32 | 82 | 83  | 32.5 | 75  | 61 | 22 | M10x20 |
| 48-E2-40x40 | 40 | 40 | 82 | 83  | 32.5 | 90  | 76 | 22 | M10x16 |
| 48-E2-50x12 | 50 | 12 | 68 | 98  | 35   | 90  | 71 | 30 | M8x30  |
| 48-E2-50x16 | 50 | 16 | 68 | 98  | 35   | 90  | 76 | 30 | M10x30 |
| 48-E2-50x20 | 50 | 20 | 68 | 98  | 35   | 90  | 76 | 30 | M12x25 |
| 48-E2-50x25 | 50 | 25 | 68 | 98  | 35   | 90  | 76 | 30 | M12x25 |
| 48-E2-50x30 | 50 | 30 | 68 | 98  | 35   | 90  | 76 | 30 | M12x20 |
| 48-E2-50x32 | 50 | 32 | 68 | 98  | 35   | 90  | 76 | 30 | M12x20 |
| 48-E2-50x40 | 50 | 40 | 98 | 98  | 35   | 90  | 76 | 30 | M12x16 |
| 48-E2-50x50 | 50 | 50 | 98 | 98  | 35   | 100 | 86 | 30 | M12x12 |
| 48-E2-60x16 | 60 | 16 | 68 | 123 | 42.5 | 90  | 76 | 30 | M10x30 |
| 48-E2-60x20 | 60 | 20 | 68 | 123 | 42.5 | 90  | 76 | 30 | M12x25 |
| 48-E2-60x25 | 60 | 25 | 68 | 123 | 42.5 | 90  | 76 | 30 | M12x25 |
| 48-E2-60x32 | 60 | 32 | 68 | 123 | 42.5 | 90  | 76 | 30 | M12x20 |
| 48-E2-60x40 | 60 | 40 | 98 | 123 | 42.5 | 90  | 76 | 30 | M12x20 |
| 48-E2-60x50 | 60 | 50 | 98 | 123 | 42.5 | 100 | 86 | 30 | M12x16 |

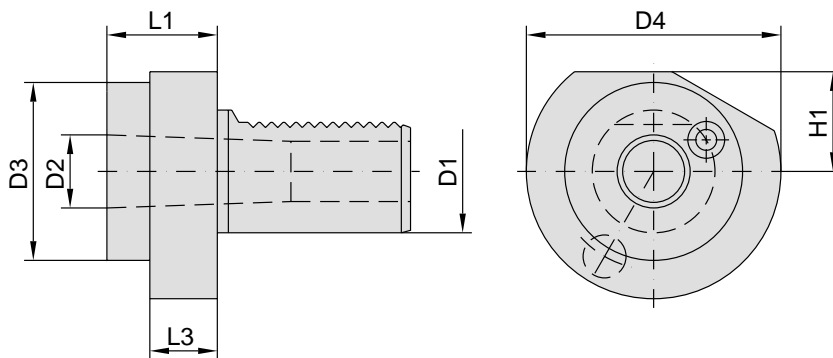
## ER Collet Chuck Holder, Form E4



### 48-E4-...

| Item No.           | D1 | Collet Size | D2 (clamping range) | D3 | D4  | H1   | L1 | L3 |
|--------------------|----|-------------|---------------------|----|-----|------|----|----|
| <b>48-E4-16x16</b> | 16 | ER-16       | 0.5-10              | 32 | 40  | 18   | 44 | 13 |
| <b>48-E4-16x20</b> | 16 | ER-20       | 1-13                | 35 | 40  | 18   | 44 | 13 |
| <b>48-E4-20x25</b> | 20 | ER-25       | 1-16                | 42 | 50  | -    | 65 | 18 |
| <b>48-E4-20x32</b> | 20 | ER-32       | 2-20                | 50 | 50  | -    | 67 | 18 |
| <b>48-E4-25x25</b> | 25 | ER-25       | 1-16                | 42 | 58  | 25   | 58 | 18 |
| <b>48-E4-25x32</b> | 25 | ER-32       | 2-20                | 50 | 58  | 25   | 63 | 18 |
| <b>48-E4-30x25</b> | 30 | ER-25       | 1-16                | 42 | 68  | 28   | 57 | 22 |
| <b>48-E4-30x32</b> | 30 | ER-32       | 2-20                | 50 | 68  | 28   | 78 | 22 |
| <b>48-E4-30x40</b> | 30 | ER-40       | 3-26                | 63 | 68  | 28   | 80 | 22 |
| <b>48-E4-40x25</b> | 40 | ER-25       | 1-16                | 42 | 83  | 32.5 | 57 | 22 |
| <b>48-E4-40x32</b> | 40 | ER-32       | 2-20                | 50 | 83  | 32.5 | 78 | 22 |
| <b>48-E4-40x40</b> | 40 | ER-40       | 3-26                | 63 | 83  | 32.5 | 80 | 22 |
| <b>48-E4-50x32</b> | 50 | ER-32       | 2-20                | 50 | 98  | 35   | 93 | 30 |
| <b>48-E4-50x40</b> | 50 | ER-40       | 3-26                | 63 | 98  | 35   | 80 | 30 |
| <b>48-E4-60x32</b> | 60 | ER-32       | 2-20                | 50 | 123 | 42.5 | 78 | 30 |
| <b>48-E4-60x40</b> | 60 | ER-40       | 3-26                | 63 | 123 | 42.5 | 80 | 30 |

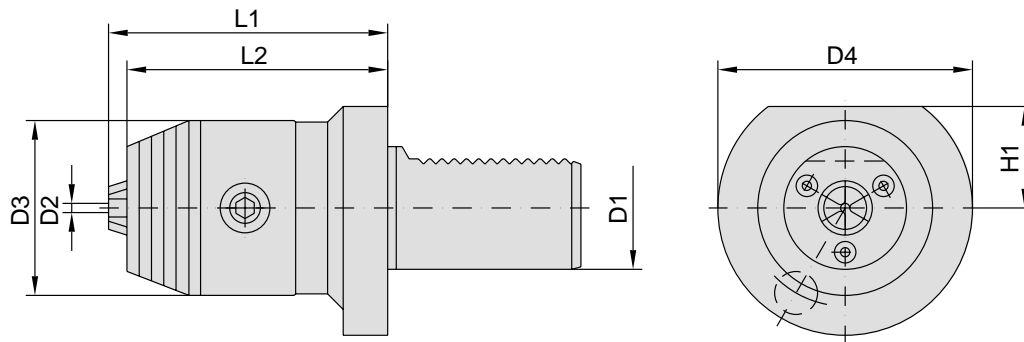
## Morse Taper Holder, Form F



### 48-F-...

| Item No.    | D1 | D2 (MK) | D3 | D4  | H1   | L1 | L3 |
|-------------|----|---------|----|-----|------|----|----|
| 48-F-16xMK1 | 16 | 1       | -  | 40  | -    | 61 | -  |
| 48-F-16xMK2 | 16 | 2       | -  | 42  | -    | 72 | -  |
| 48-F-20xMK1 | 20 | 1       | -  | 50  | -    | 23 | -  |
| 48-F-20xMK2 | 20 | 2       | 45 | 50  | -    | 41 | 22 |
| 48-F-25xMK1 | 25 | 1       | 45 | 58  | 25   | 23 | 18 |
| 48-F-25xMK2 | 25 | 2       | 45 | 58  | 25   | 34 | 18 |
| 48-F-25xMK3 | 25 | 3       | 49 | 58  | 25   | 91 | 18 |
| 48-F-30xMK1 | 30 | 1       | -  | 68  | 28   | 27 | -  |
| 48-F-30xMK2 | 30 | 2       | 55 | 68  | 28   | 36 | 27 |
| 48-F-30xMK3 | 30 | 3       | 55 | 68  | 28   | 66 | 41 |
| 48-F-40xMK2 | 40 | 2       | 55 | 83  | 32.5 | 36 | 22 |
| 48-F-40xMK3 | 40 | 3       | 58 | 83  | 32.5 | 36 | 22 |
| 48-F-40xMK4 | 40 | 4       | 68 | 83  | 32.5 | 80 | 22 |
| 48-F-50xMK2 | 50 | 2       | 55 | 98  | 35   | 36 | 30 |
| 48-F-50xMK3 | 50 | 3       | 58 | 98  | 35   | 45 | 30 |
| 48-F-50xMK4 | 50 | 4       | 68 | 98  | 35   | 55 | 30 |
| 48-F-50xMK5 | 50 | 5       | 75 | 98  | 35   | 72 | 30 |
| 48-F-60xMK2 | 60 | 2       | 55 | 123 | 42.5 | 35 | 30 |
| 48-F-60xMK3 | 60 | 3       | 58 | 123 | 42.5 | 45 | 30 |
| 48-F-60xMK4 | 60 | 4       | 68 | 123 | 42.5 | 55 | 30 |
| 48-F-60xMK5 | 60 | 5       | 88 | 123 | 42.5 | 63 | 30 |

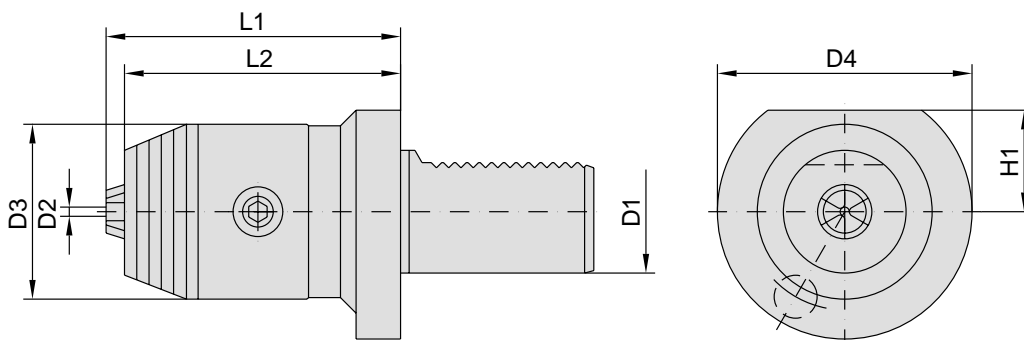
## Precision Drill Chuck, external coolant supply



### 48-BE-...

| Item No.    | D1 | D2<br>(clamping range) | D3 | D4  | H1   | L1  | L2   |
|-------------|----|------------------------|----|-----|------|-----|------|
| 48-BE-16x8  | 16 | 0.5-8                  | 40 | 40  | 18   | 63  | 60   |
| 48-BE-20x8  | 20 | 0.5-8                  | 40 | 50  | 23   | 63  | 60   |
| 48-BE-20x13 | 20 | 1-13                   | 57 | 57  | -    | 88  | 82   |
| 48-BE-25x8  | 25 | 0.5-8                  | 40 | 58  | 25   | 63  | 60   |
| 48-BE-30x8  | 30 | 0.5-8                  | 40 | 68  | 28   | 63  | 60   |
| 48-BE-30x13 | 30 | 1-13                   | 57 | 68  | -    | 88  | 82   |
| 48-BE-30x16 | 30 | 3-16                   | 57 | 68  | -    | 93  | 82   |
| 48-BE-40x8  | 40 | 0.5-8                  | 40 | 83  | 32.5 | 68  | 65   |
| 48-BE-40x13 | 40 | 1-13                   | 57 | 83  | 32.5 | 91  | 85   |
| 48-BE-40x16 | 40 | 3-16                   | 57 | 83  | 32.5 | 96  | 85   |
| 48-BE-50x13 | 50 | 1-13                   | 57 | 98  | 35   | 91  | 85   |
| 48-BE-50x16 | 50 | 3-16                   | 57 | 98  | 35   | 96  | 85   |
| 48-BE-60x16 | 60 | 3-16                   | 57 | 123 | 42.5 | 103 | 92.5 |

## Precision Drill Chuck, internal coolant supply

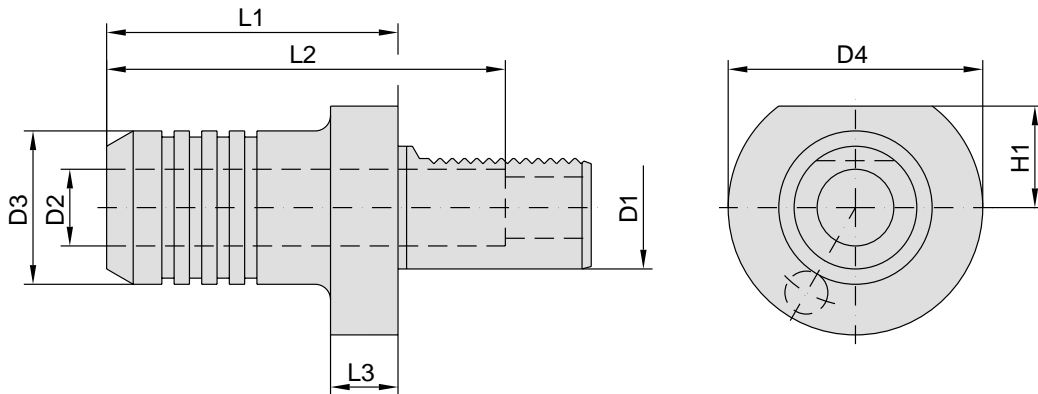


### 48-BI-...

| Item No.    | D1 | D2<br>(clamping range) | D3 | D4  | H1   | L1  | L2 |
|-------------|----|------------------------|----|-----|------|-----|----|
| 48-BI-16x8  | 16 | 0.5-8                  | 36 | 40  | 18   | 71  | 68 |
| 48-BI-20x8  | 20 | 0.5-8                  | 36 | 50  | 23   | 71  | 68 |
| 48-BI-20x13 | 20 | 1-13                   | 50 | 57  | -    | 96  | 90 |
| 48-BI-25x8  | 25 | 0.5-8                  | 36 | 58  | 25   | 71  | 68 |
| 48-BI-30x8  | 30 | 0.5-8                  | 36 | 68  | 28   | 71  | 68 |
| 48-BI-30x13 | 30 | 1-13                   | 50 | 68  | 28   | 96  | 90 |
| 48-BI-30x16 | 30 | 3-16                   | 57 | 68  | -    | 101 | 90 |
| 48-BI-40x8  | 40 | 0.5-8                  | 36 | 83  | 32.5 | 71  | 68 |
| 48-BI-40x13 | 40 | 1-13                   | 50 | 83  | 32.5 | 96  | 90 |
| 48-BI-40x16 | 40 | 3-16                   | 57 | 83  | 32.5 | 101 | 90 |
| 48-BI-50x13 | 50 | 1-13                   | 50 | 98  | 35   | 96  | 90 |
| 48-BI-50x16 | 50 | 3-16                   | 57 | 98  | 35   | 101 | 90 |
| 48-BI-60x16 | 60 | 3-16                   | 57 | 123 | 42.5 | 101 | 90 |



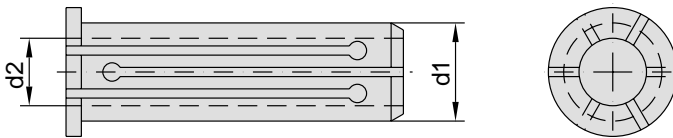
## Hydraulic Chuck



### 48-HS-...

| Item No.    | D1 | D2 | D3 | D4 | H1   | L1 | L2  | L3 |
|-------------|----|----|----|----|------|----|-----|----|
| 48-HS-30x20 | 30 | 20 | 42 | 68 | 28   | 89 | 130 | 16 |
| 48-HS-30x25 | 30 | 25 | 50 | 68 | 28   | 94 | 95  | 16 |
| 48-HS-30x32 | 30 | 32 | 60 | 68 | 28   | 94 | 95  | 16 |
| 48-HS-40x20 | 40 | 20 | 42 | 83 | 32.5 | 95 | 130 | 22 |
| 48-HS-40x25 | 40 | 25 | 50 | 83 | 32.5 | 95 | 130 | 22 |
| 48-HS-40x32 | 40 | 32 | 60 | 83 | 32.5 | 95 | 95  | 17 |

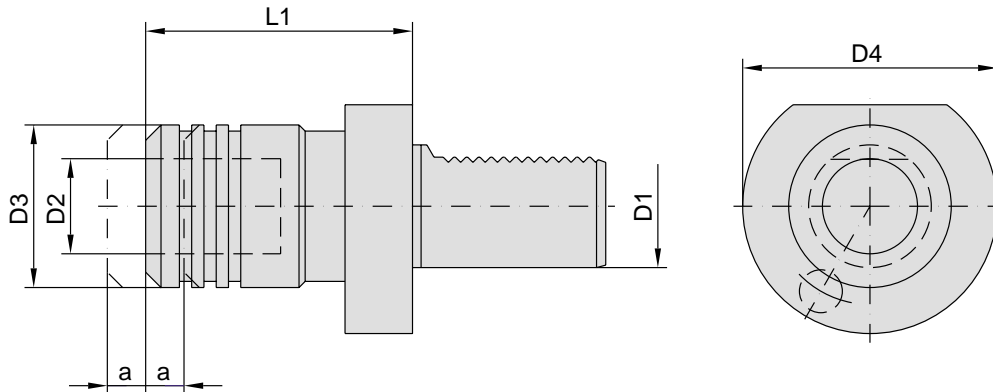
## Reducing Sleeve for Hydraulic Chuck



### 2440...

| Item No.  | d1 | d2 |
|-----------|----|----|
| 244020003 | 20 | 3  |
| 244020004 | 20 | 4  |
| 244020005 | 20 | 5  |
| 244020006 | 20 | 6  |
| 244020008 | 20 | 8  |
| 244020010 | 20 | 10 |
| 244020012 | 20 | 12 |
| 244020014 | 20 | 14 |
| 244020016 | 20 | 16 |
| 244032006 | 32 | 6  |
| 244032008 | 32 | 8  |
| 244032010 | 32 | 10 |
| 244032012 | 32 | 12 |
| 244032014 | 32 | 14 |
| 244032016 | 32 | 16 |
| 244032020 | 32 | 20 |
| 244032025 | 32 | 25 |

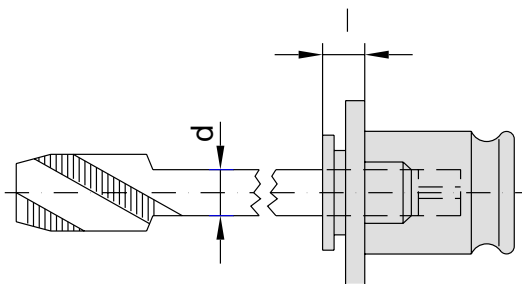
## Quick Change Tapping Head



### 48-GS-... with tension and compression

| Item No.   | D1 | D2<br>(clamping range) | D3 | D4  | L1   | a    | Corresponding Adaptor |
|------------|----|------------------------|----|-----|------|------|-----------------------|
| 48-GS-16x1 | 16 | M3-M12                 | 36 | 40  | 52   | 7.5  | WE-1 (170012...)      |
| 48-GS-20x1 | 20 | M3-M12                 | 36 | 50  | 58   | 7.5  | WE-1 (170012...)      |
| 48-GS-26x1 | 25 | M3-M12                 | 36 | 58  | 50   | 7.5  | WE-1 (170012...)      |
| 48-GS-30x1 | 30 | M3-M12                 | 36 | 68  | 62.5 | 7.5  | WE-1 (170012...)      |
| 48-GS-30x2 | 30 | M8-M20                 | 53 | 68  | 87   | 12.5 | WE-2 (170020...)      |
| 48-GS-40x1 | 40 | M3-M12                 | 36 | 83  | 62.5 | 7.5  | WE-1 (170012...)      |
| 48-GS-40x2 | 40 | M6-M20                 | 53 | 83  | 87   | 12.5 | WE-2 (170020...)      |
| 48-GS-40x3 | 40 | M14-M33                | 78 | 83  | 122  | 20   | WE-3 (170033...)      |
| 48-GS-50x1 | 50 | M3-M12                 | 36 | 98  | 70.5 | 7.5  | WE-1 (170012...)      |
| 48-GS-50x2 | 50 | M6-M20                 | 53 | 98  | 104  | 12.5 | WE-2 (170020...)      |
| 48-GS-50x3 | 50 | M14-M33                | 78 | 98  | 108  | 20   | WE-3 (170033...)      |
| 48-GS-50x4 | 50 | M22-M48                | 96 | 98  | 122  | 22.5 | WE-4 (170048...)      |
| 48-GS-60x2 | 60 | M6-M20                 | 53 | 123 | 104  | 12.5 | WE-2 (170020...)      |
| 48-GS-60x3 | 60 | M14-M33                | 78 | 123 | 108  | 20   | WE-3 (170033...)      |
| 48-GS-60x4 | 60 | M22-M48                | 96 | 123 | 119  | 22.5 | WE-4 (170048...)      |

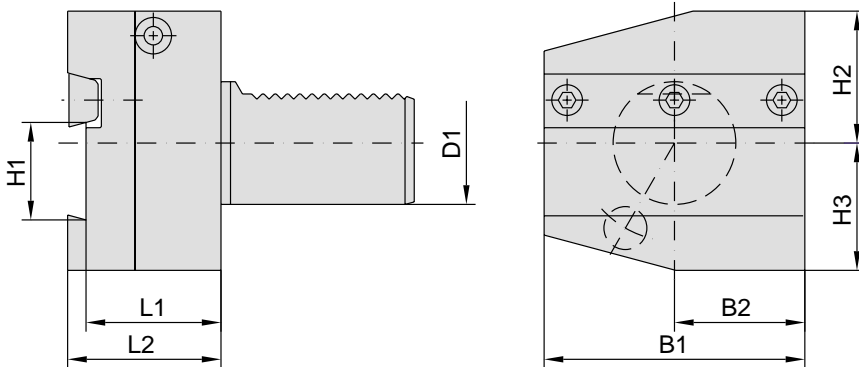
### Adaptors for Quick Change Tapping Head



### 1700...

| Item No.        | Size | Range   | Tap shank dia.<br>∅             | l  |
|-----------------|------|---------|---------------------------------|----|
| 170010...[d*10] | WE-0 | M1-M10  | 2.5/2.8/3.5/4/4.5/5/5.6/7/8     | 7  |
| 170012...[d*10] | WE-1 | M3-M12  | 2.8/3.5/4/4.5/5/5.6/7/8/9/10/11 | 7  |
| 170020...[d*10] | WE-2 | M8-M20  | 7/8/9/10/11/12/14/16            | 11 |
| 170033...[d*10] | WE-3 | M14-M33 | 11/12/14/16/18/20/22/25         | 14 |
| 170048...[d*10] | WE-4 | M22-M48 | 18/20/22/25/28/32/36            | 42 |

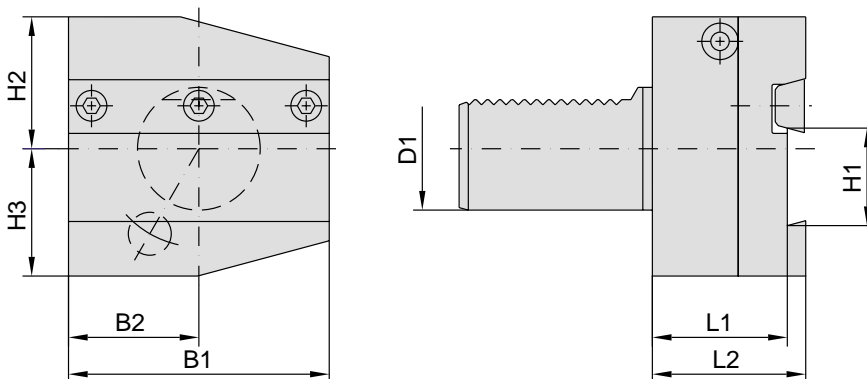
## Cut-Off Holder, adjustable height, right hand



### 48-AR-...

| Item No.    | D1 | H1 | B1  | B2   | H2 | H3   | L1 | L2 |
|-------------|----|----|-----|------|----|------|----|----|
| 48-AR-25x26 | 25 | 26 | 60  | 30   | 28 | 36   | 44 | 50 |
| 48-AR-30x26 | 30 | 26 | 70  | 35   | 32 | 39   | 44 | 50 |
| 48-AR-40x26 | 40 | 26 | 85  | 42.5 | 43 | 41.5 | 44 | 50 |
| 48-AR-40x32 | 40 | 32 | 85  | 42.5 | 43 | 41.5 | 44 | 50 |
| 48-AR-50x26 | 50 | 26 | 100 | 50   | 43 | 45   | 44 | 50 |
| 48-AR-50x32 | 50 | 32 | 100 | 50   | 43 | 45   | 44 | 50 |
| 48-AR-60x32 | 60 | 32 | 125 | 62.5 | 48 | 55   | 44 | 50 |

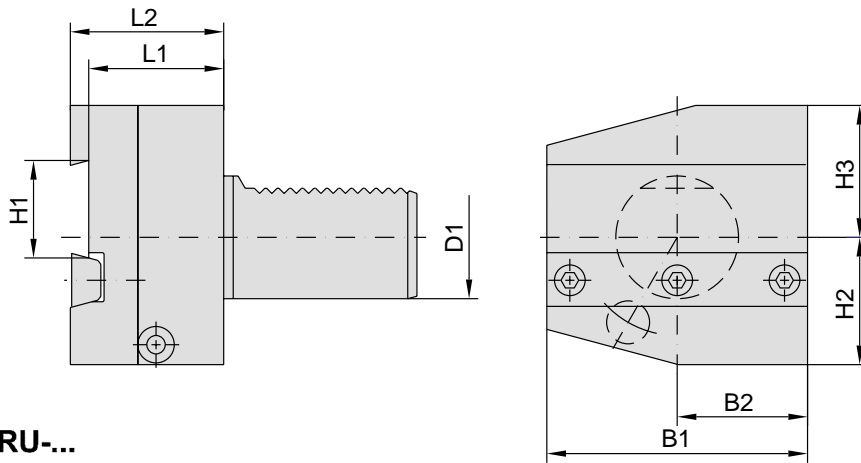
## Cut-Off Holder, adjustable height, left hand



### 48-AL-...

| Item No.    | D1 | H1 | B1  | B2   | H2 | H3   | L1 | L2 |
|-------------|----|----|-----|------|----|------|----|----|
| 48-AL-25x26 | 25 | 26 | 60  | 30   | 28 | 36   | 44 | 50 |
| 48-AL-30x26 | 30 | 26 | 70  | 35   | 32 | 39   | 44 | 50 |
| 48-AL-40x26 | 40 | 26 | 85  | 42.5 | 43 | 41.5 | 44 | 50 |
| 48-AL-40x32 | 40 | 32 | 85  | 42.5 | 43 | 41.5 | 44 | 50 |
| 48-AL-50x26 | 50 | 26 | 100 | 50   | 43 | 45   | 44 | 50 |
| 48-AL-50x32 | 50 | 32 | 100 | 50   | 43 | 45   | 44 | 50 |
| 48-AL-60x32 | 60 | 32 | 125 | 62.5 | 48 | 55   | 44 | 50 |

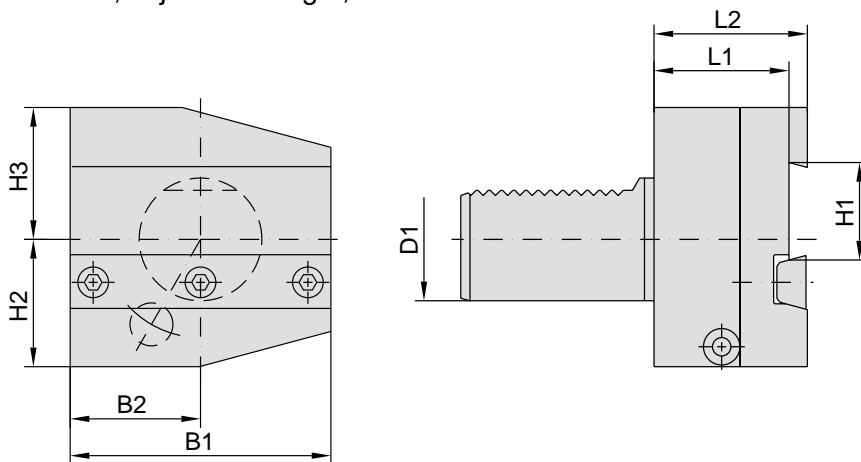
Cut-Off Holder, adjustable height, right hand inverted



**48-ARU-...**

| Item No.            | D1 | H1 | B1  | B2   | H2   | H3 | L1 | L2 |
|---------------------|----|----|-----|------|------|----|----|----|
| <b>48-ARU-25x26</b> | 25 | 26 | 60  | 30   | 28   | 36 | 44 | 50 |
| <b>48-ARU-30x26</b> | 30 | 26 | 70  | 35   | 35   | 38 | 44 | 50 |
| <b>48-ARU-40x26</b> | 40 | 26 | 85  | 42.5 | 41.5 | 43 | 44 | 50 |
| <b>48-ARU-40x32</b> | 40 | 32 | 85  | 42.5 | 41.5 | 43 | 44 | 50 |
| <b>48-ARU-50x26</b> | 50 | 26 | 100 | 50   | 45   | 43 | 44 | 50 |
| <b>48-ARU-50x32</b> | 50 | 32 | 100 | 50   | 45   | 43 | 44 | 50 |
| <b>48-ARU-60x32</b> | 60 | 32 | 125 | 62.5 | 55   | 48 | 44 | 50 |

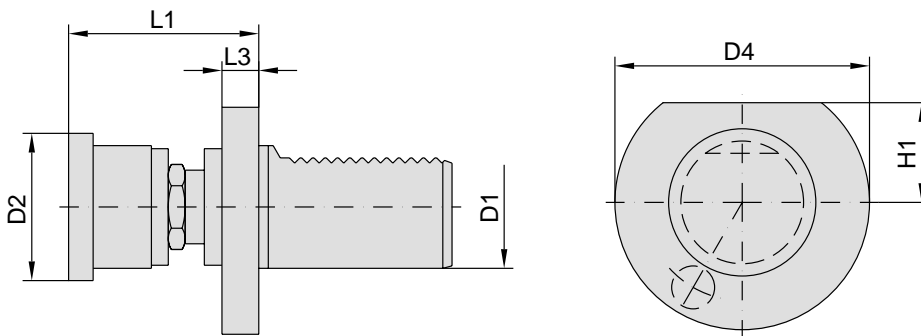
Cut-Off Holder, adjustable height, left hand inverted



**48-ALU-...**

| Item No.            | D1 | H1 | B1  | B2   | H2   | H3   | L1 | L2 |
|---------------------|----|----|-----|------|------|------|----|----|
| <b>48-ALU-25x26</b> | 25 | 26 | 60  | 30   | 28   | 36   | 44 | 50 |
| <b>48-ALU-30x26</b> | 30 | 26 | 70  | 35   | 32   | 38   | 44 | 50 |
| <b>48-ALU-40x26</b> | 40 | 26 | 85  | 42.5 | 43   | 41.5 | 44 | 50 |
| <b>48-ALU-40x32</b> | 40 | 32 | 85  | 42.5 | 43.5 | 41.5 | 44 | 50 |
| <b>48-ALU-50x26</b> | 50 | 26 | 100 | 50   | 45   | 43   | 44 | 50 |
| <b>48-ALU-50x32</b> | 50 | 32 | 100 | 50   | 45   | 43   | 44 | 50 |
| <b>48-ALU-60x32</b> | 60 | 32 | 125 | 62.5 | 55   | 48   | 44 | 50 |

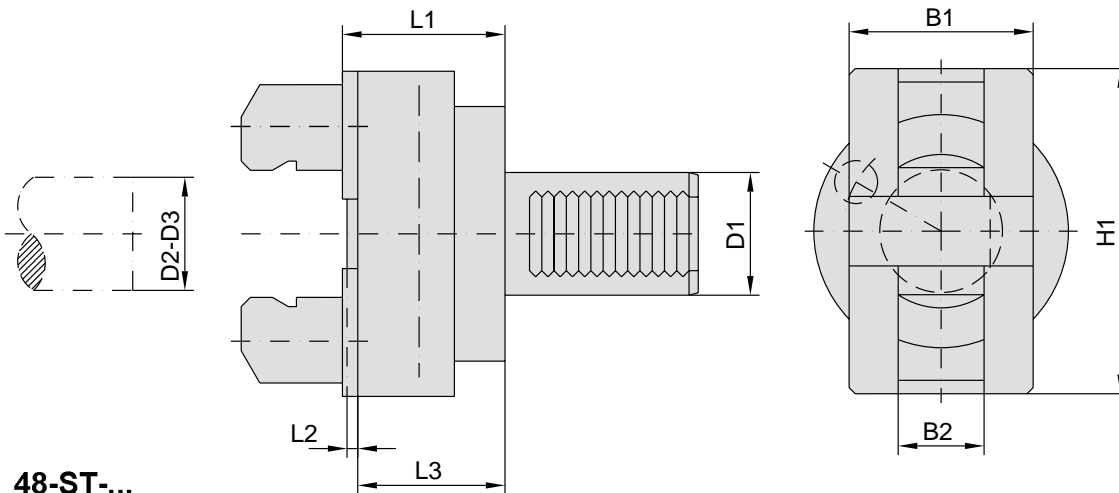
## Rotating Bar Stop



### 48-WA-...

| Item No.    | D1 | D2 | D4 | H1   | L1     | L3 |
|-------------|----|----|----|------|--------|----|
| 48-WA-20x26 | 20 | 26 | 50 | 23   | 60-85  | 18 |
| 48-WA-20x32 | 20 | 32 | 50 | 23   | 60-85  | 18 |
| 48-WA-20x42 | 20 | 42 | 50 | 23   | 60-85  | 18 |
| 48-WA-30x32 | 30 | 32 | 68 | 28   | 84-102 | 22 |
| 48-WA-30x42 | 30 | 42 | 68 | 28   | 84-102 | 22 |
| 48-WA-30x58 | 30 | 58 | 68 | 28   | 84-102 | 22 |
| 48-WA-40x32 | 40 | 32 | 83 | 32.5 | 84-102 | 22 |
| 48-WA-40x42 | 40 | 42 | 83 | 32.5 | 84-102 | 22 |
| 48-WA-40x58 | 40 | 58 | 83 | 32.5 | 84-102 | 22 |

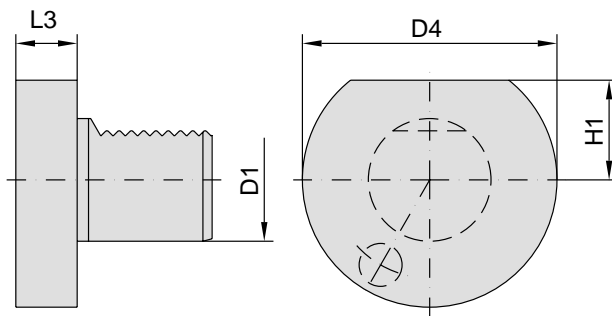
## Bar Puller



### 48-ST-...

| Item No.    | D1 | D2    | D3     | B1 | B2 | H1  | L1 | L2 | L3 |
|-------------|----|-------|--------|----|----|-----|----|----|----|
| 48-ST-20x56 | 20 | 6-56  | 54-110 | 50 | 28 | 72  | 51 | 4  | 46 |
| 48-ST-25x56 | 25 | 6-56  | 54-110 | 50 | 28 | 72  | 51 | 4  | 46 |
| 48-ST-30x56 | 30 | 6-56  | 54-110 | 50 | 28 | 72  | 51 | 4  | 46 |
| 48-ST-40x60 | 40 | 10-60 | 54-110 | 60 | 28 | 110 | 53 | 4  | 48 |
| 48-ST-50x75 | 50 | 10-75 | 62-125 | 65 | 28 | 130 | 73 | 5  | 67 |
| 48-ST-60x75 | 60 | 10-75 | 62-125 | 65 | 28 | 130 | 73 | 5  | 67 |

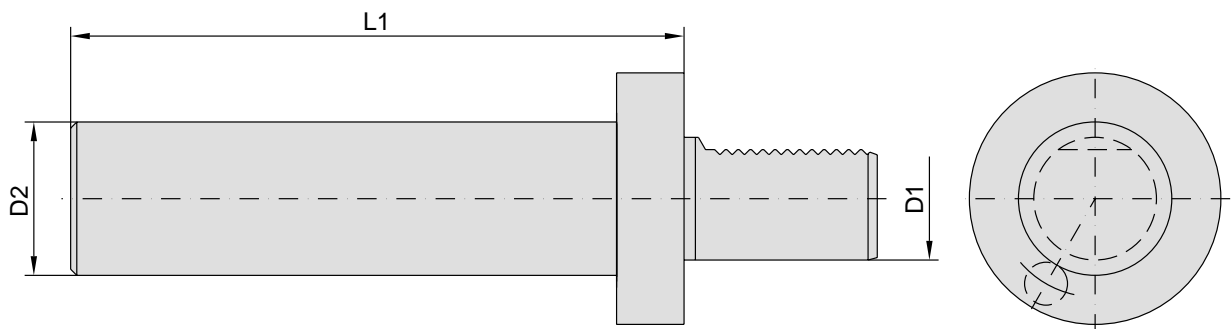
Plug, Form Z2



**48-Z2-...**

| Item No.            | D1 | D4  | H1   | L3 | Material            |
|---------------------|----|-----|------|----|---------------------|
| <b>48-Z2-16-S/P</b> | 16 | 40  | 18   | 16 | S=Steel / P=Plastic |
| <b>48-Z2-20-S/P</b> | 20 | 50  | 23   | 16 | S=Steel / P=Plastic |
| <b>48-Z2-25-S</b>   | 25 | 58  | 25   | 16 | S=Steel             |
| <b>48-Z2-30-S/P</b> | 30 | 68  | 28   | 16 | S=Steel / P=Plastic |
| <b>48-Z2-40-S/P</b> | 40 | 83  | 32.5 | 20 | S=Steel / P=Plastic |
| <b>48-Z2-50-S/P</b> | 50 | 98  | 35   | 20 | S=Steel / P=Plastic |
| <b>48-Z2-60-S/P</b> | 60 | 123 | 42.5 | 20 | S=Steel / P=Plastic |

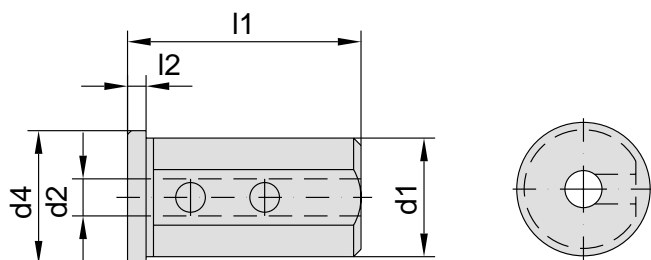
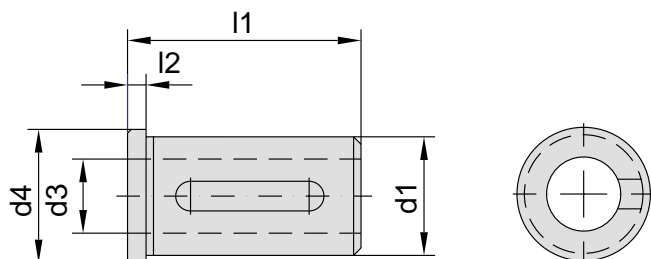
Test Bar



**48-PD-...**

| Item No.           | D1 | D2 | L1  |
|--------------------|----|----|-----|
| <b>48-PD-16x25</b> | 16 | 25 | 200 |
| <b>48-PD-20x30</b> | 20 | 30 | 220 |
| <b>48-PD-25x30</b> | 25 | 30 | 220 |
| <b>48-PD-30x40</b> | 30 | 40 | 230 |
| <b>48-PD-40x50</b> | 40 | 50 | 300 |
| <b>48-PD-50x50</b> | 50 | 50 | 300 |
| <b>48-PD-60x60</b> | 60 | 60 | 300 |

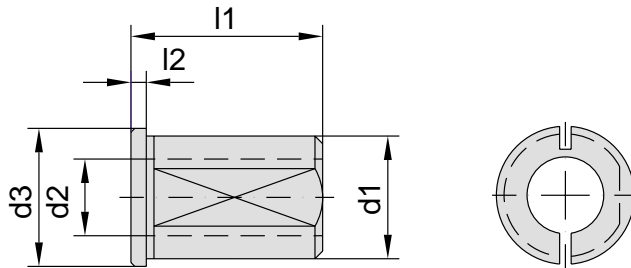
Bushings for Boring Bar Holders, internal and external coolant



2400...

| Item No.  | d1 | d2 | d3 | d4 | l1 | l2 |
|-----------|----|----|----|----|----|----|
| 240025006 | 25 | 6  | -  | 29 | 50 | 4  |
| 240025008 | 25 | 8  | -  | 29 | 50 | 4  |
| 240025010 | 25 | 10 | -  | 29 | 50 | 4  |
| 240025012 | 25 | 12 | -  | 29 | 50 | 4  |
| 240025016 | 25 | -  | 16 | 29 | 50 | 4  |
| 240025020 | 25 | -  | 20 | 29 | 50 | 4  |
| 240032006 | 32 | 6  | -  | 36 | 63 | 5  |
| 240032008 | 32 | 8  | -  | 36 | 63 | 5  |
| 240032010 | 32 | 10 | -  | 36 | 63 | 5  |
| 240032012 | 32 | 12 | -  | 36 | 63 | 5  |
| 240032016 | 32 | -  | 16 | 36 | 63 | 5  |
| 240032020 | 32 | -  | 20 | 36 | 63 | 5  |
| 240032025 | 32 | -  | 25 | 36 | 63 | 5  |
| 240040008 | 40 | 8  | -  | 44 | 58 | 5  |
| 240040010 | 40 | 10 | -  | 44 | 58 | 5  |
| 240040012 | 40 | 12 | -  | 44 | 58 | 5  |
| 240040016 | 40 | -  | 16 | 44 | 58 | 5  |
| 240040020 | 40 | -  | 20 | 44 | 58 | 5  |
| 240040025 | 40 | -  | 25 | 44 | 58 | 5  |
| 240040032 | 40 | -  | 32 | 44 | 58 | 5  |
| 240050012 | 50 | 12 | -  | 54 | 75 | 5  |
| 240050016 | 50 | -  | 16 | 54 | 75 | 5  |
| 240050020 | 50 | -  | 20 | 54 | 75 | 5  |
| 240050025 | 50 | -  | 25 | 54 | 75 | 5  |
| 240050032 | 50 | -  | 32 | 54 | 75 | 5  |
| 240050010 | 50 | -  | 40 | 54 | 75 | 5  |

## Bushings with slot for Boring Bar Holders

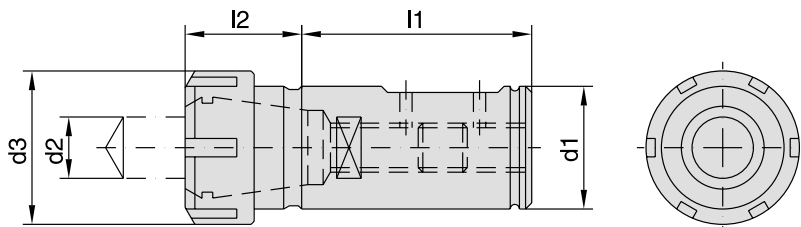


### 2401...

| Item No.  | d1 | d2 | d3 | l1 | L2 |
|-----------|----|----|----|----|----|
| 240120006 | 20 | 6  | 24 | 30 | 4  |
| 240120008 | 20 | 8  | 24 | 30 | 4  |
| 240120010 | 20 | 10 | 24 | 30 | 4  |
| 240120012 | 20 | 12 | 24 | 30 | 4  |
| 240120015 | 20 | 15 | 24 | 30 | 4  |
| 240120016 | 20 | 16 | 24 | 30 | 4  |
| 240125006 | 25 | 6  | 29 | 40 | 4  |
| 240125008 | 25 | 8  | 29 | 40 | 4  |
| 240125010 | 25 | 10 | 29 | 40 | 4  |
| 240125012 | 25 | 12 | 29 | 40 | 4  |
| 240125015 | 25 | 15 | 29 | 40 | 4  |
| 240125016 | 25 | 16 | 29 | 40 | 4  |
| 240125020 | 25 | 20 | 29 | 40 | 4  |
| 240130008 | 30 | 8  | 34 | 50 | 4  |
| 240130010 | 30 | 10 | 34 | 50 | 4  |
| 240130012 | 30 | 12 | 34 | 50 | 4  |
| 240130015 | 30 | 15 | 34 | 50 | 4  |
| 240130016 | 30 | 16 | 34 | 50 | 4  |
| 240130020 | 30 | 20 | 34 | 50 | 4  |
| 240130025 | 30 | 25 | 34 | 50 | 4  |
| 240132008 | 32 | 8  | 36 | 50 | 4  |
| 240132010 | 32 | 10 | 36 | 50 | 4  |
| 240132012 | 32 | 12 | 36 | 50 | 4  |
| 240132015 | 32 | 15 | 36 | 50 | 4  |
| 240132016 | 32 | 16 | 36 | 50 | 4  |
| 240132020 | 32 | 20 | 36 | 50 | 4  |
| 240132025 | 32 | 25 | 36 | 50 | 4  |
| 240140010 | 40 | 10 | 44 | 78 | 4  |
| 240140012 | 40 | 12 | 44 | 78 | 4  |
| 240140015 | 40 | 15 | 44 | 78 | 4  |
| 240140016 | 40 | 16 | 44 | 78 | 4  |
| 240140020 | 40 | 20 | 44 | 78 | 4  |
| 240140025 | 40 | 25 | 44 | 78 | 4  |
| 240140032 | 40 | 32 | 44 | 78 | 4  |
| 240150020 | 50 | 20 | 64 | 88 | 4  |
| 240150025 | 50 | 25 | 64 | 88 | 4  |
| 240150032 | 50 | 32 | 64 | 88 | 4  |
| 240150040 | 50 | 40 | 64 | 88 | 4  |



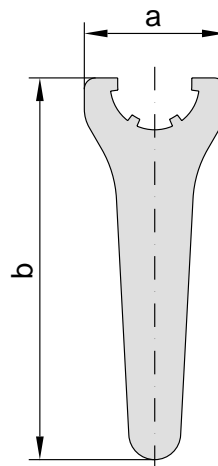
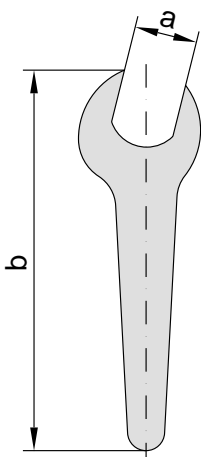
## ER Collet Chuck with cylindrical shank



### 2410...

| Item No.         | d1 | d2<br>(clamping range) | d3 | l1 | l2 | Corresponding collet |
|------------------|----|------------------------|----|----|----|----------------------|
| <b>241025016</b> | 25 | 1-16                   | 42 | 40 | 31 | ER-25 (190025...)    |
| <b>241032016</b> | 32 | 1-16                   | 42 | 60 | 32 | ER-25 (190025...)    |
| <b>241032020</b> | 32 | 2-20                   | 50 | 60 | 38 | ER-32 (190032...)    |
| <b>241040020</b> | 40 | 2-20                   | 50 | 75 | 38 | ER-32 (190032...)    |
| <b>241040026</b> | 40 | 3-26                   | 63 | 75 | 55 | ER-40 (190040...)    |

## Wrenches for ER Collet Chuck

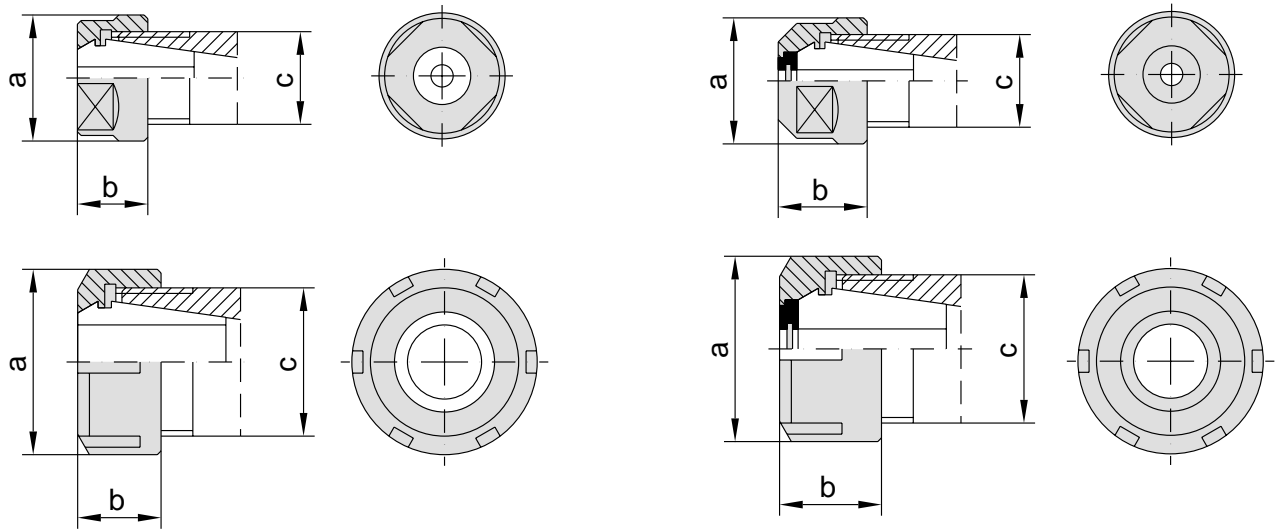


### 1075...

| Item No.         | Size  | a  | b   |
|------------------|-------|----|-----|
| <b>107511000</b> | ER-11 | 17 | 95  |
| <b>107516000</b> | ER-16 | 25 | 144 |
| <b>107520000</b> | ER-20 | 30 | 172 |

| Item No.         | Size  | a   | b   |
|------------------|-------|-----|-----|
| <b>107525000</b> | ER-25 | 65  | 210 |
| <b>107532000</b> | ER-32 | 75  | 250 |
| <b>107540000</b> | ER-40 | 90  | 290 |
| <b>107550000</b> | ER-50 | 110 | 350 |

## Clamping Nuts for ER Collet Chuck



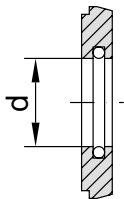
### 2000... for external coolant supply

| Item No.  | Size  | a  | b    | c        |
|-----------|-------|----|------|----------|
| 200011000 | ER-11 | 19 | 11.3 | M14x0.75 |
| 200016000 | ER-16 | 28 | 17.5 | M22x1.5  |
| 200020000 | ER-20 | 34 | 19   | M25x1.5  |
| 200025000 | ER-25 | 42 | 20   | M32x1.5  |
| 200032000 | ER-32 | 50 | 22.5 | M40x1.5  |
| 200040000 | ER-40 | 63 | 25.5 | M50x1.5  |
| 200050000 | ER-50 | 78 | 35.3 | M64x2.0  |

### 2050... for internal coolant supply

| Item No.  | Size  | a  | b    | c       |
|-----------|-------|----|------|---------|
| 205016000 | ER-16 | 28 | 22.5 | M22x1.5 |
| 205020000 | ER-20 | 34 | 24   | M25x1.5 |
| 205025000 | ER-25 | 42 | 25   | M32x1.5 |
| 205032000 | ER-32 | 50 | 27.5 | M40x1.5 |
| 205040000 | ER-40 | 63 | 30.5 | M50x1.5 |

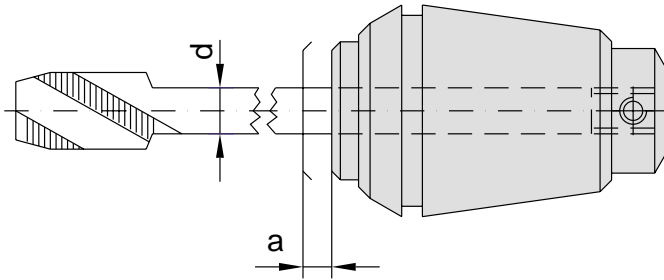
## Sealing Washers for Clamping Nuts with internal coolant supply



### 2101...

| Item No. unit   | Item No. complete set | Size  | d      | Range per washer | Order Example                                  |
|-----------------|-----------------------|-------|--------|------------------|--|
| 210116...[d*10] | 210116000             | ER-16 | 3.5-10 | 0.5              | 210116040 is suitable for shank dia. = 4-3.5   |
| 210120...[d*10] | 210120000             | ER-20 | 3.5-13 | 0.5              | 210120120 is suitable for shank dia. = 12-11.5 |
| 210125...[d*10] | 210125000             | ER-25 | 3.5-16 | 0.5              |  |
| 210132...[d*10] | 210132000             | ER-32 | 3.5-20 | 0.5              |  |
| 210140...[d*10] | 210140000             | ER-40 | 3.5-26 | 0.5              |  |

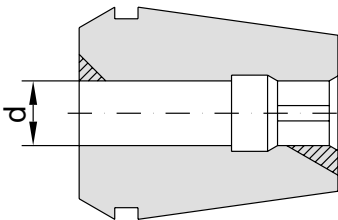
Tapping Collets, type ET-1, with tension



## 1800...

| Item No.        | Type    | Size  | Range    | d<br>Shank   | a   |
|-----------------|---------|-------|----------|--|-----|
| 180012...[d*10] | ET-1-12 | ER-11 | M1-M5    | 1.4/1.6/1.8/2.0/2.2/2.24/2.5/2.8/3/3.15/3.5/3.55                     | 5.5 |
| 180016...[d*10] | ET-1-16 | ER-16 | M1-M8    | 1.4/1.6/1.8/2.0/2.2/2.24/2.5/2.8/3/3.15/3/3.5/3.55/4/4.5/5/5.5/6/6.2 | 7   |
| 180020...[d*10] | ET-1-20 | ER-20 | M1-M10   | 2.2/2.24/2.5/2.8/3/3.15/3/3.5/3.55/4/4.5/5/5.5/6/6.2/6.3/7           | 7   |
| 180025...[d*10] | ET-1-25 | ER-25 | M1-M10   | 2.5/2.8/3/3.15/3/3.5/3.55/4/4.5/5/5.5/6/6.2/6.3/7/7.10/8/8.5/9/10    | 8   |
| 180032...[d*10] | ET-1-32 | ER-32 | M4.5-M16 | 4.5/5/5.5/6/6.2/6.3/7/7.10/8/8.5/9/10/10.5/11/11.2/12/12.5           | 10  |
| 180040...[d*10] | ET-1-40 | ER-40 | M4.5-M22 | 6/6.2/6.3/7/7.10/8/8.5/9/10/10.5/11/11.2/12/12.5/14/15/16            | 13  |

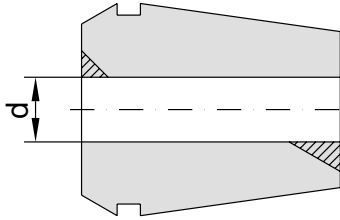
ER Tapping Collets, type ER-GB, for rigid tapping



## 1810...

| Item No.        | Type     | Size  | Range    | d<br>Shank  |
|-----------------|----------|-------|----------|---|
| 181016...[d*10] | ER-16-GB | ER-16 | M3.5-M9  | 4/4.5/5/5.5/6/6.2/6.3/7/7.1/8/8.5/9   |
| 181020...[d*10] | ER-20-GB | ER-20 | M3.5-M14 | 4/4.5/5/5.5/6/6.2/6.3/7/7.1/8/8.5/9/10/10.5/11/11.2                           |
| 181025...[d*10] | ER-25-GB | ER-25 | M3.5-M22 | 4/4.5/5/5.5/6/6.2/6.3/7/7.1/8/8.5/9/10/10.5/11/11.2/12/12.5/14/15/16          |
| 181032...[d*10] | ER-32-GB | ER-32 | M3.5-M27 | 4/4.5/5/5.5/6/6.2/6.3/7/7.1/8/8.5/9/10/10.5/11/11.2/12/12.5/14/15/16/17/18/20 |
| 181040...[d*10] | ER-40-GB | ER-40 | M4.5-M30 | 6/6.2/6.3/7/7.1/8/8.5/9/10/10.5/11/11.2/12/12.5/14/15/16/17/18/20/22          |

## ER Collets (ER/ESX), High Precision

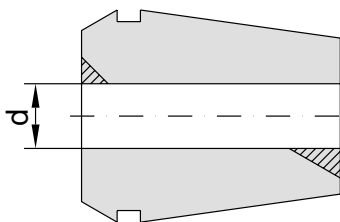


### 1900...

| Item No. unit          | Item No. complete set | Size  | d      | Range per collet | Run-out tolerance* | Order example                    |
|------------------------|-----------------------|-------|--------|------------------|--------------------|----------------------------------|
| <b>190011...[d*10]</b> | <b>190011000</b>      | ER-11 | 7-0.5  | 0.5              | 0.01               | 190011010 for shank dia. = 1-0.5 |
| <b>190016010</b>       |                       | ER-16 | 1-0.5  | 0.5              | 0.01               |                                  |
| <b>190016...[d*10]</b> |                       | ER-16 | 10-1   | 1                | 0.01               | 190016020 for shank dia. = 2-1   |
|                        | <b>190016000</b>      | ER-16 | 10-0.5 | -                | 0.01               |                                  |
| <b>190020...[d*10]</b> | <b>190020000</b>      | ER-20 | 13-1   | 1                | 0.01               | 190020020 for shank dia. = 2-1   |
| <b>190025...[d*10]</b> | <b>190025000</b>      | ER-25 | 16-1   | 1                | 0.01               | 190025020 for shank dia. = 2-1   |
| <b>190032...[d*10]</b> | <b>190032000</b>      | ER-32 | 20-2   | 1                | 0.01               | 190032030 for shank dia. = 3-2   |
| <b>190040...[d*10]</b> | <b>190040000</b>      | ER-40 | 26-3   | 1                | 0.01               | 190040040 for shank dia. = 4-3   |
| <b>190050...[d*10]</b> | <b>190050000</b>      | ER-50 | 34-10  | 2                | 0.015              | 190050120 for shank dia. = 12-10 |

\*with test mandrel according DIN 6499

## ER Collets DIN 6499B (ER-UP), Ultra Precision

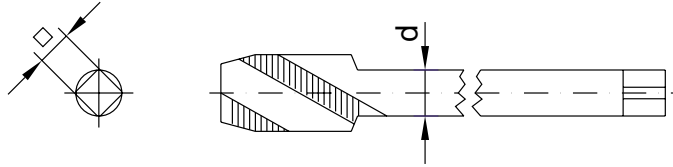


### 1901...

| Item No. unit          | Item No. complete set | Size  | d      | Range per collet | Run-out tolerance* | Order example                    |
|------------------------|-----------------------|-------|--------|------------------|--------------------|----------------------------------|
| <b>190111...[d*10]</b> | <b>190111000</b>      | ER-11 | 7-0.5  | 0.5              | 0.005              | 190111010 for shank dia. = 1-0.5 |
| <b>190116010</b>       |                       | ER-16 | 1-0.5  | 0.5              | 0.005              |                                  |
| <b>190116...[d*10]</b> |                       | ER-16 | 10-1   | 1                | 0.005              | 190116020 for shank dia. = 2-1   |
|                        | <b>190116000</b>      | ER-16 | 10-0.5 | -                | 0.005              |                                  |
| <b>190120...[d*10]</b> | <b>190120000</b>      | ER-20 | 13-1   | 1                | 0.005              | 190120020 for shank dia. = 2-1   |
| <b>190125...[d*10]</b> | <b>190125000</b>      | ER-25 | 16-1   | 1                | 0.005              | 190125020 for shank dia. = 2-1   |
| <b>190132...[d*10]</b> | <b>190132000</b>      | ER-32 | 20-2   | 1                | 0.005              | 190132030 for shank dia. = 3-2   |
| <b>190140...[d*10]</b> | <b>190140000</b>      | ER-40 | 26-3   | 1                | 0.005              | 190140040 for shank dia. = 4-3   |
| <b>190150...[d*10]</b> | <b>190150000</b>      | ER-50 | 34-10  | 2                | 0.01               | 190150120 for shank dia. = 12-10 |

\*with test mandrel according DIN 6499

## Tap Shank Diameters



| Thread |        | ISO 529 |       | ISO 2283 |      | DIN 371 |      | DIN 357 / 376 |       | DIN 352 |       | Japan JIS |       | US Standard |       |
|--------|--------|---------|-------|----------|------|---------|------|---------------|-------|---------|-------|-----------|-------|-------------|-------|
| [mm]   | [inch] | [dØ]    | [□]   | [dØ]     | [□]  | [dØ]    | [□]  | [dØ]          | [□]   | [dØ]    | [□]   | [dØ]      | [□]   | [dØ]"       | [□]"  |
| M 1.0  |        | 2.50    | 2.10  | -        | -    | 2.50    | 2.10 | -             | -     | 2.50    | 2.10  | 3.00      | 2.50  | -           | -     |
| M 1.1  |        | 2.50    | 2.10  | -        | -    | 2.50    | 2.10 | -             | -     | 2.50    | 2.10  | 3.00      | 2.50  | -           | -     |
| M 1.2  |        | 2.50    | 2.10  | -        | -    | 2.50    | 2.10 | -             | -     | 2.50    | 2.10  | 3.00      | 2.50  | -           | -     |
| M 1.4  |        | 2.50    | 2.10  | -        | -    | 2.50    | 2.10 | -             | -     | 2.50    | 2.10  | 3.00      | 2.50  | -           | -     |
| M 1.6  | 1/16   | 2.50    | 2.10  | -        | -    | 2.50    | 2.10 | -             | -     | 2.50    | 2.10  | 3.00      | 2.50  | 0.141       | 0.110 |
| M 1.7  |        | 2.50    | 2.10  | -        | -    | 2.50    | 2.10 | -             | -     | 2.50    | 2.10  | 3.00      | 2.50  | -           | -     |
| M 1.8  |        | 2.50    | 2.10  | -        | -    | 2.50    | 2.10 | -             | -     | 2.50    | 2.10  | 3.00      | 2.50  | 0.141       | 0.110 |
| M 2.0  |        | 2.80    | 2.10  | 2.50     | 2.00 | 2.50    | 2.10 | -             | -     | 2.80    | 2.10  | 3.00      | 2.50  | 0.141       | 0.110 |
| M 2.2  |        | 2.80    | 2.10  | 2.80     | 2.24 | 2.50    | 2.10 | -             | -     | 2.80    | 2.10  | 3.00      | 2.50  | 0.141       | 0.110 |
| M 2.3  |        | 2.80    | 2.10  | 2.80     | 2.24 | 2.50    | 2.10 | -             | -     | 2.80    | 2.10  | 3.00      | 2.50  | -           | -     |
| M 2.5  | 3/32   | 2.80    | 2.10  | 2.80     | 2.24 | 2.50    | 2.10 | -             | -     | 2.80    | 2.10  | 3.00      | 2.50  | 0.141       | 0.110 |
| M 2.6  |        | 2.80    | 2.10  | 2.80     | 2.24 | 2.50    | 2.10 | -             | -     | 2.80    | 2.10  | 3.00      | 2.50  | -           | -     |
| M 3.0  | 1/18   | 3.15    | 2.50  | 3.15     | 2.50 | 3.50    | 2.70 | 3.00          | -     | 3.50    | 2.70  | 4.00      | 3.00  | 0.141       | 0.110 |
| M 3.5  |        | 3.55    | 2.80  | 3.55     | 2.80 | 4.00    | 3.00 | 2.50          | 2.10  | 4.00    | 3.00  | 4.00      | 3.00  | 0.141       | 0.110 |
| M 4.0  | 5/32   | 4.00    | 3.15  | -        | -    | 4.50    | 3.40 | 2.80          | 2.10  | 4.50    | 3.40  | 5.00      | 4.00  | 0.168       | 0.131 |
| M 4.5  | 3/16   | 4.50    | 3.55  | -        | -    | 6.00    | 4.90 | 3.50          | 2.70  | 6.00    | 4.90  | 5.00      | 4.00  | 0.194       | 0.152 |
| M 5.0  |        | 5.00    | 4.00  | -        | -    | 6.00    | 4.90 | 3.50          | 2.70  | 6.00    | 4.90  | 5.50      | 4.50  | 0.194       | 0.152 |
| M 6.0  | 1/4    | 6.30    | 5.00  | -        | -    | 6.00    | 4.90 | 4.50          | 3.40  | 6.00    | 4.90  | 6.00      | 4.50  | 0.255       | 0.191 |
| M 7.0  | 5/16   | 7.10    | 5.60  | -        | -    | 7.00    | 5.50 | 5.50          | 4.30  | 6.00    | 4.90  | 6.20      | 5.00  | 0.318       | 0.238 |
| M 8.0  |        | 8.00    | 6.30  | -        | -    | 8.00    | 6.20 | 6.00          | 4.90  | 6.00    | 4.90  | 6.20      | 5.00  | 0.318       | 0.238 |
| M 9.0  |        | 9.00    | 7.10  | -        | -    | 9.00    | 7.00 | 7.00          | 5.50  | 7.00    | 5.50  | 7.00      | 5.50  | 0.381       | 0.286 |
| M 10.0 | 3/8    | 10.00   | 8.00  | -        | -    | 10.00   | 8.00 | 7.00          | 5.50  | 7.00    | 5.50  | 7.00      | 5.50  | 0.381       | 0.286 |
| M 11.0 |        | 8.00    | 6.30  | -        | -    | -       | -    | 8.00          | 6.20  | 8.00    | 6.20  | 8.00      | 6.20  | 0.381       | 0.286 |
| M 12.0 | 1/2    | 9.00    | 7.10  | 9.00     | -    | -       | -    | 9.00          | 7.00  | 9.00    | 7.00  | 8.50      | 6.50  | 0.367       | 0.275 |
| M 14.0 | 9/16   | 11.20   | 9.00  | 11.20    | -    | -       | -    | 11.00         | 9.00  | 11.00   | 9.00  | 10.50     | 8.00  | 0.429       | 0.322 |
| M 16.0 | 5/8    | 12.50   | 10.00 | 12.50    | -    | -       | -    | 12.00         | 9.00  | 12.00   | 9.00  | 12.50     | 10.00 | 0.480       | 0.360 |
| M 18.0 | 11/16  | 14.00   | 11.20 | 14.00    | -    | -       | -    | 14.00         | 11.00 | 14.00   | 11.00 | 14.00     | 11.00 | 0.542       | 0.406 |
| M 20.0 | 13/16  | 14.00   | 11.20 | 14.00    | -    | -       | -    | 16.00         | 12.00 | 16.00   | 12.00 | 15.00     | 12.00 | 0.652       | 0.489 |
| M 22.0 | 7/8    | 16.00   | 12.50 | 16.00    | -    | -       | -    | 18.00         | 14.50 | 18.00   | 14.50 | 17.00     | 13.00 | 0.697       | 0.523 |
| M 24.0 | 15/16  | 18.00   | 14.00 | 18.00    | -    | -       | -    | 18.00         | 14.50 | 18.00   | 14.50 | 19.00     | 15.00 | 0.760       | 0.570 |
| M 27.0 | 1 1/16 | 20.00   | 16.00 | 20.00    | -    | -       | -    | 20.00         | 16.00 | 20.00   | 16.00 | 20.00     | 15.00 | 0.896       | 0.672 |
| M 30.0 | 1 3/16 | 20.00   | 16.00 | 20.00    | -    | -       | -    | 22.00         | 18.00 | 22.00   | 18.00 | 23.00     | 23.17 | 1.021       | 0.766 |

All sizes in mm (except US Standard in inch)

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Tools

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## Higher Productivity

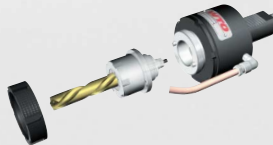
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