

# TURNING

## How to select internal turning tools

### Explanation of internal turning tools detailed table

- Listed according to clamping types.

Approach angle of tools

Tools type

The first 4 letters in the type description stands for tool shape and applicatio.

Insert type

Specification chart

Application chart

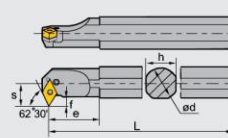
The arrow shows suitable applications such as internal turning, profiling and end turning, etc.

#### Corresponding tool holders of insert DN ☐ ☐ P-type clamping

**PDSNR/L**  
Kr:62°30°



R-type shown



| Type              | Stock |   | Basic dimensions(mm) |    |    |     |    |      |    |     | Screw   | Wrench | Lever | Shim  | Shim pin |
|-------------------|-------|---|----------------------|----|----|-----|----|------|----|-----|---------|--------|-------|-------|----------|
|                   | R     | L | Dmin                 | ed | h  | L   | S  | θ    | e  | f   |         |        |       |       |          |
| S32R-PDSNR/L15    | △     | △ | 40                   | 32 | 30 | 200 | 22 | -11° | 45 | 8.5 | LEM8×21 | WH30L  | L4B   | D15AP | SP4      |
| S32U-PDSNR/L15    | ▲     | ▲ | 40                   | 32 | 30 | 350 | 22 | -11° | 45 | 8.5 | LEM8×21 | WH30L  | L4    | D15AP | SP4      |
| S32R-PDSNR/L15-3  | △     | △ | 40                   | 32 | 30 | 200 | 22 | -11° | 45 | 8.5 | LEM8×21 | WH30L  | L4    | D15AP | SP4      |
| S32U-PDSNR/L15-3  | ▲     | ▲ | 40                   | 32 | 30 | 350 | 22 | -11° | 45 | 8.5 | LEM8×21 | WH30L  | L4    | D15AP | SP4      |
| S40S-PDSNR/L15    | △     | △ | 50                   | 40 | 37 | 250 | 27 | -11° | 43 | 9.4 | LEM8×21 | WH30L  | L4B   | D15AP | SP4      |
| S40V-PDSNR/L15    | ▲     | ▲ | 50                   | 40 | 37 | 400 | 27 | -11° | 43 | 9.4 | LEM8×21 | WH30L  | L4    | D15AP | SP4      |
| S40S-PDSNR/L15-3  | △     | △ | 50                   | 40 | 37 | 250 | 27 | -11° | 43 | 9.4 | LEM8×21 | WH30L  | L4    | D15AP | SP4      |
| S40V-PDSNR/L15-3  | ▲     | ▲ | 50                   | 40 | 37 | 400 | 27 | -11° | 43 | 9.4 | LEM8×21 | WH30L  | L4    | D15AP | SP4      |
| *A32S-PDSNR/L15   | △     | △ | 40                   | 32 | 31 | 250 | 22 | -11° | 45 | 8.5 | LEM8×21 | WH30L  | L4B   | D15AP | SP4      |
| *A32S-PDSNR/L15-3 | △     | △ | 40                   | 32 | 31 | 250 | 22 | -11° | 45 | 8.5 | LEM8×21 | WH30L  | L4    | D15AP | SP4      |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

| Applicable inserts |                |                    |                          |                            |
|--------------------|----------------|--------------------|--------------------------|----------------------------|
| Application        | For finishing  | For semi-finishing | For roughing             | For cast iron machining    |
| Inserts shape      | DF<br>A53      | PM<br>A54          | DR<br>Double-side<br>A56 | Without chipbreaker<br>A58 |
|                    | SF<br>A53      | DM<br>A55          | DR<br>Single-side<br>A57 |                            |
|                    | EF<br>A54      | EM<br>A56          | ER<br>Double-side<br>A57 |                            |
|                    | NF<br>A54      | NM<br>A56          | ER<br>Single-side<br>A57 |                            |
| Tool holder type   | □□-PDSNR/L15-3 | DN□□1504□□         | DN□□1504□□               | DN□□1504□□                 |
|                    | □□-PDSNR/L15   | DN□□1506□□         | DN□□1506□□               | DN□□1506□□                 |

Tool holders with oil hole

Products specification

Including product description, stock (left and right hand), basic dimensions and applicable spare parts.

Applicable inserts

Including applications of inserts, reference page, insert shape and corresponding tool holders.

# TURNING

## Internal turning tools

**Internal turning tools overview**    **A191**

**Internal turning tools code key**    **A192-A193**

**Detailed table of internal turning tools**    **A194-A222**

Internal turning Tools by P-type clamping    A194-A200

Internal turning tools by S-type clamping    A201-A216

Damping internal turning tools and their features    A217-A222

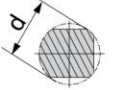
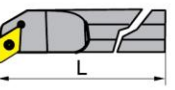
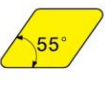
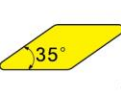


| Name                           | Feature                                                                                                                                                                                             | 62°30'                                                                                                   | 75°                                                                                                      | 85°                                                                                                      | 90°                                                                                                      | 91°                                                                                                      | 93°                                                                                                         | 93°                                                                                                          | 95°                                                                                                          | 107°30'                                                                                                      |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| P-type internal turning tools  | <ul style="list-style-type: none"> <li>The minimum machining diameter is 20mm.</li> <li>Applicable inserts are economic negative inserts.</li> <li>Hole clamping</li> </ul>                         |                         |                         |                         |                         |                         |                           |                           |                           |                           |
|                                |                                                                                                                                                                                                     | <b>PDSN</b><br><br>A196 | <b>PSKN</b><br><br>A198 |                                                                                                          | <b>PTFN</b><br><br>A199 |                                                                                                          |                                                                                                             | <b>PDUN</b><br><br>A197   | <b>PCLN</b><br><br>A194   |                                                                                                              |
| S-type internal turning tools  | <ul style="list-style-type: none"> <li>The minimum machining diameter is 10mm</li> <li>Applicable inserts are 5°, 7° and 11° positive inserts.</li> <li>Screw clamping</li> </ul>                   |                                                                                                          | <b>SSKC</b><br><br>A205 | <b>SDZC</b><br><br>A204 | <b>SCFC</b><br><br>A215 | <b>STFC</b><br><br>A206 | <b>STUP</b><br><br>A214   | <b>SDUC</b><br><br>A203   |                                                                                                              | <b>SDQC</b><br><br>A202   |
|                                |                                                                                                                                                                                                     |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                             | <b>SDUP</b><br><br>A213 | <b>SCLC</b><br><br>A201 | <b>SDQP</b><br><br>A212 |
|                                |                                                                                                                                                                                                     |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                             | <b>SVUC</b><br><br>A208 | <br>A216                | <b>SVQB</b><br><br>A209 |
|                                |                                                                                                                                                                                                     |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                             | <b>SVUB</b><br><br>A210 | <b>SCLP</b><br><br>A211 | <b>SVQC</b><br><br>A207 |
| Damping internal turning tools | <ul style="list-style-type: none"> <li>The minimum diameter can be machined is 12mm</li> <li>Applicable inserts are 7°, 11° positive inserts</li> <li>Good Performance on reducing shake</li> </ul> |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                          | <b>STUP</b><br><br>A221 | <b>SDUP</b><br><br>A220 | <b>SCLP</b><br><br>A218 | <b>SDQP</b><br><br>A219 |
|                                |                                                                                                                                                                                                     |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                          |                                                                                                             | <b>SVUC</b><br><br>A222 |                                                                                                              | <b>SVQC</b><br><br>A222 |

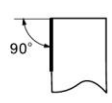
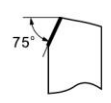
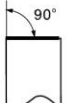
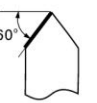
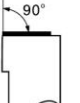
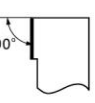
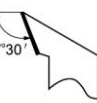
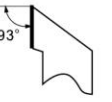
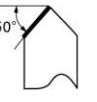
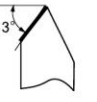
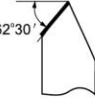
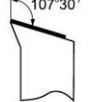
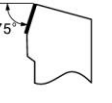
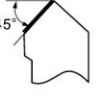
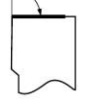
A

General turning

Internal turning tools code key

| Type of tool holder |                                            | Diameter of tool holder                                                           | Length of tool holder                                                             | Clamping system                                                                                               | Inserts shape                                                                            |                                                                                          |
|---------------------|--------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Code                | Type                                       |                                                                                   |                                                                                   |                                                                                                               |                                                                                          |                                                                                          |
| A                   | Steel tool holder with oil-hole            |  |  | <br>P-Hole clamping         | <br>C | <br>D |
| C                   | Cemented carbide tool holder               | Code Diameter                                                                     | Code Length                                                                       | <br>M-Top and hole clamping | <br>R | <br>S |
| E                   | Cemented carbide tool holder with oil hole | 16 16<br>20 20<br>25 25                                                           | H 100<br>K 125<br>M 150<br>N 160<br>Q 180                                         | <br>S-Screw on              | <br>T | <br>V |
| S                   | Steel tool holder                          | 32 32<br>40 40                                                                    | R 200<br>S 250<br>T 300<br>U 350<br>V 400                                         | <br>C-Top clamping          | <br>W |                                                                                          |
| X                   | Special inserts applied                    | 50 50                                                                             |                                                                                   |                                                                                                               |                                                                                          |                                                                                          |

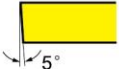
S 16 R - S D U

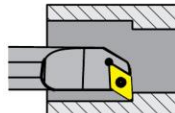
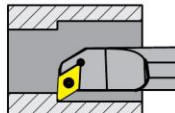
| Tool holder style and approach angle                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| A                                                                                   | B                                                                                   | C                                                                                   | D                                                                                   | E                                                                                   | F                                                                                    | G                                                                                     | H                                                                                     |
|  |  |  |  |  |  |  |  |
| J                                                                                   | K                                                                                   | L                                                                                   | M                                                                                   | N                                                                                   | O                                                                                    | P                                                                                     | Q                                                                                     |
|  |  |  |  |  |  |  |  |
| R                                                                                   | S                                                                                   | T                                                                                   | U                                                                                   | V                                                                                   | W                                                                                    | X                                                                                     |                                                                                       |
|  |  |  |  |  |  |  |                                                                                       |

# General Turning Tools

Internal turning tools code key

# TURNING

| Clearance angle of insert                                                         |          |
|-----------------------------------------------------------------------------------|----------|
|  | <b>B</b> |
|  | <b>C</b> |
|  | <b>D</b> |
|  | <b>E</b> |
|  | <b>N</b> |
|  | <b>P</b> |

| Cutting direction                                                                 |
|-----------------------------------------------------------------------------------|
|  |
| <b>L - Left hand</b>                                                              |
|  |
| <b>R - Right hand</b>                                                             |

| Manufacture option |                              |
|--------------------|------------------------------|
| <b>D</b>           | Increase offset f size+1.0mm |
| <b>E</b>           | Increase offset f size+2.0mm |
| <b>R</b>           | Round shank                  |
| <b>W</b>           | Wedge clamping               |
| <b>X</b>           | Back boring                  |

**C**

**R**

**07**

| Length of cutting edge |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
|------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Inserts shape          | <b>C</b>                                                                            | <b>D</b>                                                                            | <b>R</b>                                                                            | <b>S</b>                                                                            | <b>T</b>                                                                              | <b>V</b>                                                                              | <b>W</b>                                                                              |
|                        |  |  |  |  |  |  |  |
| Inscribed circle       | Length of cutting edge(mm)                                                          |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| 5.556                  | ---                                                                                 | ---                                                                                 | ---                                                                                 | ---                                                                                 | 09                                                                                    | ---                                                                                   | ---                                                                                   |
| 6.350                  | 06                                                                                  | 07                                                                                  | ---                                                                                 | ---                                                                                 | 11                                                                                    | ---                                                                                   | ---                                                                                   |
| 9.525                  | 09                                                                                  | 11                                                                                  | 09                                                                                  | 09                                                                                  | 16                                                                                    | 16                                                                                    | 06                                                                                    |
| 12.700                 | 12                                                                                  | 15                                                                                  | 12                                                                                  | 12                                                                                  | 22                                                                                    | 22                                                                                    | 08                                                                                    |
| 15.875                 | 16                                                                                  | 19                                                                                  | 15                                                                                  | 15                                                                                  | 27                                                                                    | ---                                                                                   | ---                                                                                   |
| 19.050                 | 19                                                                                  | ---                                                                                 | 19                                                                                  | 19                                                                                  | 33                                                                                    | ---                                                                                   | ---                                                                                   |
| 25.400                 | 25                                                                                  | ---                                                                                 | 25                                                                                  | 25                                                                                  | 44                                                                                    | ---                                                                                   | ---                                                                                   |

**A**

General turning

Internal turning tools code key

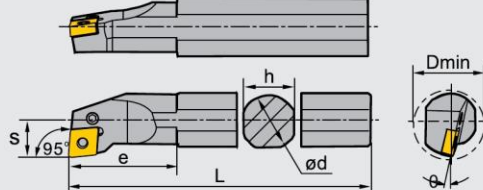
### Corresponding tool holders of insert **CN** ☐ ☐ P-type clamping

#### PCLNR/L

Kr:95°



R-type shown



| Type            | Stock |   | Basic dimensions(mm) |    |    |     |    |      |    | Screw      | Wrench | Lever | Shim   | Shim pin |
|-----------------|-------|---|----------------------|----|----|-----|----|------|----|------------|--------|-------|--------|----------|
|                 | R     | L | Dmin                 | ød | h  | L   | S  | θ    | e  |            |        |       |        |          |
| S16M-PCLNR/L09  | △     | △ | 20                   | 16 | 15 | 150 | 11 | -12° | 28 | LEM5×9B    | WH20L  | L3C   | —      | —        |
| S16R-PCLNR/L09  | ▲     | ▲ | 20                   | 16 | 15 | 200 | 11 | -12° | 28 |            |        |       |        |          |
| S20Q-PCLNR/L09  | △     | △ | 25                   | 20 | 18 | 180 | 13 | -11° | 31 |            |        |       |        |          |
| S20S-PCLNR/L09  | ▲     | ▲ | 25                   | 20 | 18 | 250 | 13 | -11° | 31 |            |        |       |        |          |
| S25Q-PCLNR/L09  | △     | △ | 32                   | 25 | 23 | 180 | 17 | -10° | 35 |            |        |       |        |          |
| S25T-PCLNR/L09  | ▲     | ▲ | 32                   | 25 | 23 | 300 | 17 | -10° | 35 | LEM6×13.4A | WH25L  | L4A   | —      | —        |
| S25Q-PCLNR/L12  | △     | △ | 32                   | 25 | 23 | 180 | 17 | -12° | 40 |            |        |       |        |          |
| S25T-PCLNR/L12  | ▲     | ▲ | 32                   | 25 | 23 | 300 | 17 | -12° | 40 |            |        |       |        |          |
| S32R-PCLNR/L12  | △     | △ | 44                   | 32 | 30 | 200 | 22 | -10° | 50 | LEM8×21    | WH30L  | L4    | C12APB | SP4      |
| S32U-PCLNR/L12  | ▲     | ▲ | 44                   | 32 | 30 | 350 | 22 | -10° | 50 |            |        |       |        |          |
| S40S-PCLNR/L12  | △     | △ | 54                   | 40 | 37 | 250 | 27 | -10° | 55 |            |        |       |        |          |
| S40V-PCLNR/L12  | ▲     | ▲ | 54                   | 40 | 37 | 400 | 27 | -10° | 55 |            |        |       |        |          |
| S50S-PCLNR/L12  | △     | △ | 63                   | 50 | 47 | 250 | 35 | -10° | 56 |            |        |       |        |          |
| S50W-PCLNR/L12  | ▲     | ▲ | 63                   | 50 | 47 | 450 | 35 | -10° | 56 | LEM10×27   | WH40L  | L6    | C19AP  | SP6      |
| S50S-PCLNR/L19  | △     | △ | 63                   | 50 | 47 | 250 | 35 | -10° | 63 |            |        |       |        |          |
| S50W-PCLNR/L19  | ▲     | ▲ | 63                   | 50 | 47 | 450 | 35 | -10° | 63 |            |        |       |        |          |
| ※A25R-PCLNR/L12 | ▲     | ▲ | 32                   | 25 | 24 | 200 | 17 | -12° | 40 | LEM6×13.4A | WH25L  | L4A   | —      | —        |
| ※A32S-PCLNR/L12 | ▲     | ▲ | 44                   | 32 | 31 | 250 | 22 | -10° | 50 | LEM8×21    | WH30L  | L4    | C12APB | SP4      |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

# General Turning Tools

Internal turning tools

# TURNING

| Applicable inserts |                                                                                                                |                                                                                                       |                                                                                                                            |                                                                                                                      |  |              |  |                         |  |
|--------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|--|--------------|--|-------------------------|--|
| Application        |                                                                                                                | For finishing                                                                                         |                                                                                                                            | For semi-finishing                                                                                                   |  | For roughing |  | For cast iron machining |  |
| Inserts shape      | <b>DF</b><br><br>A46          | <b>PM</b><br><br>A47 | <b>DR</b><br>Double<br>-side<br><br>A49 | Without<br>chipbreaker<br><br>A51 |  |              |  |                         |  |
|                    | <b>WG</b><br>Wiper<br><br>A46 | <b>DM</b><br><br>A48 | <b>DR</b><br>Single-<br>side<br><br>A50 |                                                                                                                      |  |              |  |                         |  |
|                    | <b>SF</b><br><br>A46          | <b>EM</b><br><br>A48 | <b>ER</b><br>Double<br>-side<br><br>A50 |                                                                                                                      |  |              |  |                         |  |
|                    | <b>EF</b><br><br>A46          | <b>NM</b><br><br>A49 | <b>ER</b><br>Single-<br>side<br><br>A50 |                                                                                                                      |  |              |  |                         |  |
|                    | <b>NF</b><br><br>A47          |                                                                                                       |                                                                                                                            |                                                                                                                      |  |              |  |                         |  |
| Tool holder type   | □□-PCLNR/L09                                                                                                   | CN□□0903□□                                                                                            |                                                                                                                            | CN□□0903□□                                                                                                           |  |              |  | CN□□0903□□              |  |
|                    | □□-PCLNR/L12                                                                                                   | CN□□1204□□                                                                                            |                                                                                                                            | CN□□1204□□                                                                                                           |  | CN□□1204□□   |  | CN□□1204□□              |  |
|                    | □□-PCLNR/L19                                                                                                   |                                                                                                       |                                                                                                                            |                                                                                                                      |  | CN□□1906□□   |  | CN□□1906□□              |  |

# A

General turning

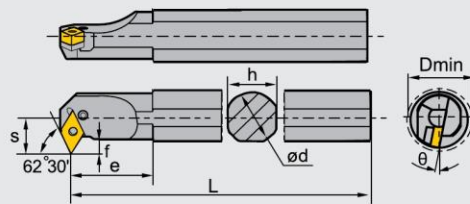
Internal turning tools

### Corresponding tool holders of insert **DN** ☐ ☐ P-type clamping

#### PDSNR/L Kr:62°30'



R-type shown



| Type              | Stock |   | Basic dimensions(mm) |    |    |     |    |      |    |     | Screw   | Wrench | Lever | Shim  | Shim pin |
|-------------------|-------|---|----------------------|----|----|-----|----|------|----|-----|---------|--------|-------|-------|----------|
|                   | R     | L | Dmin                 | ød | h  | L   | S  | θ    | e  | f   |         |        |       |       |          |
| S32R-PDSNR/L15    | △     | △ | 40                   | 32 | 30 | 200 | 22 | -11° | 45 | 8.5 | LEM8×21 | WH30L  | L4B   | D15AP | SP4      |
| S32U-PDSNR/L15    | ▲     | ▲ | 40                   | 32 | 30 | 350 | 22 | -11° | 45 | 8.5 |         |        |       |       |          |
| S32R-PDSNR/L15-3  | △     | △ | 40                   | 32 | 30 | 200 | 22 | -11° | 45 | 8.5 | LEM8×21 | WH30L  | L4    | D15AP | SP4      |
| S32U-PDSNR/L15-3  | ▲     | △ | 40                   | 32 | 30 | 350 | 22 | -11° | 45 | 8.5 |         |        |       |       |          |
| S40S-PDSNR/L15    | △     | △ | 50                   | 40 | 37 | 250 | 27 | -11° | 43 | 9.4 | LEM8×21 | WH30L  | L4B   | D15AP | SP4      |
| S40V-PDSNR/L15    | ▲     | ▲ | 50                   | 40 | 37 | 400 | 27 | -11° | 43 | 9.4 |         |        |       |       |          |
| S40S-PDSNR/L15-3  | △     | △ | 50                   | 40 | 37 | 250 | 27 | -11° | 43 | 9.4 | LEM8×21 | WH30L  | L4    | D15AP | SP4      |
| S40V-PDSNR/L15-3  | ▲     | △ | 50                   | 40 | 37 | 400 | 27 | -11° | 43 | 9.4 |         |        |       |       |          |
| ※A32S-PDSNR/L15   | △     | △ | 40                   | 32 | 31 | 250 | 22 | -11° | 45 | 8.5 | LEM8×21 | WH30L  | L4B   | D15AP | SP4      |
| ※A32S-PDSNR/L15-3 | △     | △ | 40                   | 32 | 31 | 250 | 22 | -11° | 45 | 8.5 | LEM8×21 | WH30L  | L4    | D15AP | SP4      |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

#### Applicable inserts

| Application      | For finishing  |                                                                                         | For semi-finishing |                                                                                         | For roughing   |                                                                                           | For cast iron machining                                                                                          |
|------------------|----------------|-----------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Inserts shape    | DF             |  A53 | PM                 |  A54 | DR Double-side |  A56 | Without chipbreaker<br> A58 |
|                  | SF             |  A53 | DM                 |  A55 | DR Single-side |  A57 |                                                                                                                  |
|                  | EF             |  A54 | EM                 |  A56 | ER Double-side |  A57 |                                                                                                                  |
|                  | NF             |  A54 | NM                 |  A56 | ER Single-side |  A57 |                                                                                                                  |
| Tool holder type | □□-PDSNR/L15-3 |                                                                                         | DN□□1504□□         |                                                                                         | DN□□1504□□     |                                                                                           | DN□□1504□□                                                                                                       |
|                  | □□-PDSNR/L15   |                                                                                         | DN□□1506□□         |                                                                                         | DN□□1506□□     |                                                                                           | DN□□1506□□                                                                                                       |

# General Turning Tools

Internal turning tools

# TURNING

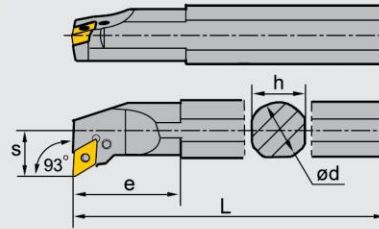
## Corresponding tool holders of insert **DN** ☐ ☐

P-type clamping

**PDUNR/L**  
Kr:93°



R-type shown



| Type               | Stock |   | Basic dimensions(mm) |    |    |     |    |      |    | Screw    | Wrench | Lever | Shim  | Shim pin |
|--------------------|-------|---|----------------------|----|----|-----|----|------|----|----------|--------|-------|-------|----------|
|                    | R     | L | Dmin                 | ød | h  | L   | S  | θ    | e  |          |        |       |       |          |
| S20Q-PDUNR/L11     | △     | △ | 25                   | 20 | 18 | 180 | 13 | -16° | 30 | LEM5×12B | WH20L  | L3D   | —     | —        |
| S20S-PDUNR/L11     | ▲     | ▲ | 25                   | 20 | 18 | 250 | 13 | -16° | 30 |          |        |       |       |          |
| S25Q-PDUNR/L11     | △     | △ | 32                   | 25 | 23 | 180 | 17 | -13° | 35 |          |        |       |       |          |
| S25T-PDUNR/L11     | ▲     | ▲ | 32                   | 25 | 23 | 300 | 17 | -13° | 35 |          |        |       |       |          |
| S32R-PDUNR/L11     | △     | △ | 40                   | 32 | 30 | 200 | 22 | -16° | 40 | LEM6×17  | WH25L  | L3    | D11AP | SP3      |
| S32U-PDUNR/L11     | ▲     | ▲ | 40                   | 32 | 30 | 350 | 22 | -16° | 40 |          |        |       |       |          |
| S32R-PDUNR/L15     | △     | △ | 40                   | 32 | 30 | 200 | 22 | -16° | 50 | LEM8×21  | WH30L  | L4B   | D15AP | SP4      |
| S32U-PDUNR/L15     | ▲     | ▲ | 40                   | 32 | 30 | 350 | 22 | -16° | 50 |          |        |       |       |          |
| S32R-PDUNR/L15-3   | △     | △ | 40                   | 32 | 30 | 200 | 22 | -16° | 50 | LEM8×21  | WH30L  | L4    | D15AP | SP4      |
| S32U-PDUNR/L15-3   | ▲     | ▲ | 40                   | 32 | 30 | 350 | 22 | -16° | 50 |          |        |       |       |          |
| S40S-PDUNR/L15     | △     | △ | 50                   | 40 | 37 | 250 | 27 | -11° | 50 | LEM8×21  | WH30L  | L4B   | D15AP | SP4      |
| S40V-PDUNR/L15     | ▲     | ▲ | 50                   | 40 | 37 | 400 | 27 | -11° | 50 |          |        |       |       |          |
| S40S-PDUNR/L15-3   | △     | △ | 50                   | 40 | 37 | 250 | 27 | -11° | 50 | LEM8×21  | WH30L  | L4    | D15AP | SP4      |
| S40V-PDUNR/L15-3   | ▲     | ▲ | 50                   | 40 | 37 | 400 | 27 | -11° | 50 |          |        |       |       |          |
| ※A32S- PDUNR/L15   | ▲     | ▲ | 40                   | 32 | 31 | 250 | 22 | -16° | 50 | LEM8×21  | WH30L  | L4B   | D15AP | SP4      |
| ※A32S- PDUNR/L15-3 | ▲     | △ | 40                   | 32 | 31 | 250 | 22 | -16° | 50 | LEM8×21  | WH30L  | L4    | D15AP | SP4      |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

## Applicable inserts

| Application      | For finishing  |                                                                                         | For semi-finishing |                                                                                         | For roughing   |                                                                                           | For cast iron machining                                                                                          |
|------------------|----------------|-----------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Inserts shape    | DF             |  A53 | PM                 |  A54 | DR Double-side |  A56 | Without chipbreaker<br> A58 |
|                  | WG Wiper       |  A53 | DM                 |  A55 | DR Single-side |  A57 |                                                                                                                  |
|                  | SF             |  A53 | EM                 |  A56 | ER Double-side |  A57 |                                                                                                                  |
|                  | EF             |  A54 | NM                 |  A56 | ER Single-side |  A57 |                                                                                                                  |
|                  | NF             |  A54 |                    |                                                                                         |                |                                                                                           |                                                                                                                  |
| Tool holder type | □□-PDUNR/L11   |                                                                                         | DN□□1104□□         |                                                                                         | DN□□1104□□     |                                                                                           |                                                                                                                  |
|                  | □□-PDUNR/L15-3 |                                                                                         | DN□□1504□□         |                                                                                         | DN□□1504□□     |                                                                                           | DN□□1504□□                                                                                                       |
|                  | □□-PDUNR/L15   |                                                                                         | DN□□1506□□         |                                                                                         | DN□□1506□□     |                                                                                           | DN□□1506□□                                                                                                       |

A

General turning

Internal turning tools

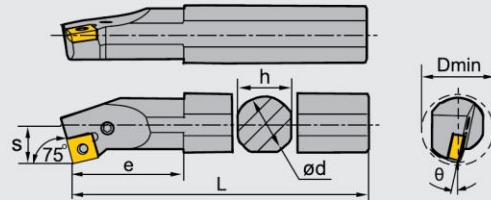
### Corresponding tool holders of insert **SN** ☐ ☐

P-type clamping

#### PSKNR/L Kr:75°



R-type shown



| Type            | Stock |   | Basic dimensions(mm) |    |    |     |    |      |    | Screw                                                                             | Wrench                                                                              | Lever                                                                               | Shim                                                                                | Shim pin                                                                            |
|-----------------|-------|---|----------------------|----|----|-----|----|------|----|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                 | R     | L | Dmin                 | ød | h  | L   | S  | θ    | e  |  |  |  |  |  |
| S25Q-PSKNR/L12  | △     | △ | 32                   | 25 | 23 | 180 | 17 | -12° | 42 | LEM6×13.4A                                                                        | WH25L                                                                               | L4A                                                                                 | —                                                                                   | —                                                                                   |
| S25T-PSKNR/L12  | ▲     | ▲ | 32                   | 25 | 23 | 300 | 17 | -12° | 42 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S32R-PSKNR/L12  | △     | △ | 44                   | 32 | 30 | 200 | 22 | -10° | 45 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S32U-PSKNR/L12  | ▲     | ▲ | 44                   | 32 | 30 | 350 | 22 | -10° | 45 | LEM8×21                                                                           | WH30L                                                                               | L4                                                                                  | S12APB                                                                              | SP4                                                                                 |
| S40S-PSKNR/L12  | △     | △ | 54                   | 40 | 37 | 250 | 27 | -10° | 50 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S40V-PSKNR/L12  | ▲     | ▲ | 54                   | 40 | 37 | 400 | 27 | -10° | 50 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| ※A25R-PSKNR/L12 | ▲     | ▲ | 32                   | 25 | 24 | 200 | 17 | -12° | 42 | LEM6×13.4A                                                                        | WH25L                                                                               | L4A                                                                                 | —                                                                                   | —                                                                                   |
| ※A32S-PSKNR/L12 | ▲     | △ | 44                   | 32 | 31 | 250 | 22 | -12° | 50 | LEM8×21                                                                           | WH30L                                                                               | L4                                                                                  | S12APB                                                                              | SP4                                                                                 |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

#### Applicable inserts

| Application      | For extra finishing                                                                        | For finishing                                                                              | For semi-finishing                                                                         | For roughing                                                                                             | For cast iron machining                                                                                       |
|------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Inserts shape    | SF  A60 | DF  A59 | PM  A60 | DR Double-side  A62 | Without chipbreaker  A65 |
|                  |                                                                                            | EF  A59 | DM  A61 | DR Single-side  A62 |                                                                                                               |
|                  |                                                                                            |                                                                                            | EM  A61 | ER Double-side  A63 |                                                                                                               |
|                  |                                                                                            |                                                                                            | NM  A62 | ER Single-side  A63 |                                                                                                               |
| Tool holder type | □□-PSKNR/L12                                                                               | SN□□1204□□                                                                                 | SN□□1204□□                                                                                 | SN□□1204□□                                                                                               | SN□□1204□□                                                                                                    |

# General Turning Tools

Internal turning tools

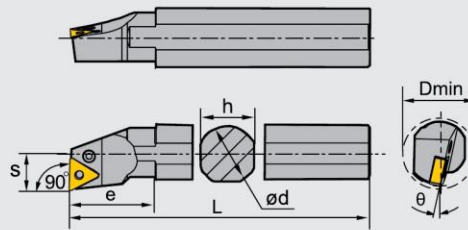
# TURNING

## Corresponding tool holders of insert **TN** ☐ ☐ P-type clamping

**PTFNR/L**  
Kr:90°



R-type shown



| Type            | Stock |   | Basic dimensions(mm) |    |    |     |    |      |    | Screw                                                                             | Wrench                                                                              | Lever                                                                               | Shim                                                                                | Shim pin                                                                            |
|-----------------|-------|---|----------------------|----|----|-----|----|------|----|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                 | R     | L | Dmin                 | ød | h  | L   | S  | θ    | e  |  |  |  |  |  |
| S16M-PTFNR/L11  | △     | △ | 20                   | 16 | 15 | 150 | 11 | -14° | 28 | LEM5×9B                                                                           | WH20L                                                                               | L2                                                                                  | —                                                                                   | —                                                                                   |
| S16R-PTFNR/L11  | ▲     | ▲ | 20                   | 16 | 15 | 200 | 11 | -14° | 28 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S20Q-PTFNR/L11  | △     | △ | 25                   | 20 | 18 | 180 | 13 | -12° | 31 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S20S-PTFNR/L11  | ▲     | ▲ | 25                   | 20 | 18 | 250 | 13 | -12° | 31 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S25Q-PTFNR/L11  | △     | △ | 32                   | 25 | 23 | 180 | 17 | -10° | 35 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S25T-PTFNR/L11  | ▲     | ▲ | 32                   | 25 | 23 | 300 | 17 | -10° | 35 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S25Q-PTFNR/L16  | △     | △ | 32                   | 25 | 23 | 180 | 17 | -12° | 42 | LEM5×12B                                                                          | WH20L                                                                               | L3B                                                                                 | —                                                                                   | —                                                                                   |
| S25T-PTFNR/L16  | ▲     | ▲ | 32                   | 25 | 23 | 300 | 17 | -12° | 42 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S32R-PTFNR/L16  | △     | △ | 44                   | 32 | 30 | 200 | 22 | -10° | 50 | LEM6×17                                                                           | WH25L                                                                               | L3                                                                                  | T16APB                                                                              | SP3                                                                                 |
| S32U-PTFNR/L16  | ▲     | ▲ | 44                   | 32 | 30 | 350 | 22 | -10° | 50 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S40S-PTFNR/L16  | △     | △ | 54                   | 40 | 37 | 250 | 27 | -10° | 55 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S40V-PTFNR/L16  | ▲     | ▲ | 54                   | 40 | 37 | 400 | 27 | -10° | 55 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| ※A25R-PTFNR/L16 | △     | △ | 32                   | 25 | 24 | 200 | 17 | -12° | 40 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| ※A32S-PTFNR/L16 | ▲     | ▲ | 44                   | 32 | 31 | 250 | 22 | -10° | 50 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

### Applicable inserts

| Application      | For finishing      |                                                                                         | For semi-finishing |                                                                                         | For roughing             |                                                                                           | For cast iron machining                                                                                          |
|------------------|--------------------|-----------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Inserts shape    | <b>DF</b>          |  A66 | <b>PM</b>          |  A67 | <b>DR</b><br>Double-side |  A68 | Without chipbreaker<br> A71 |
|                  | <b>WG</b><br>Wiper |  A66 | <b>DM</b>          |  A67 | <b>DR</b><br>Single-side |  A69 |                                                                                                                  |
|                  | <b>SF</b>          |  A66 | <b>EM</b>          |  A68 | <b>ER</b><br>Double-side |  A69 |                                                                                                                  |
|                  | <b>EF</b>          |  A66 |                    |                                                                                         |                          |                                                                                           |                                                                                                                  |
| Tool holder type | □□PTFNR/L11        |                                                                                         | TN□□1103□□         |                                                                                         | TN□□1103□□               |                                                                                           | TN□□1103□□                                                                                                       |
|                  | □□PTFNR/L16        |                                                                                         | TN□□1604□□         |                                                                                         | TN□□1604□□               |                                                                                           | TN□□1604□□                                                                                                       |

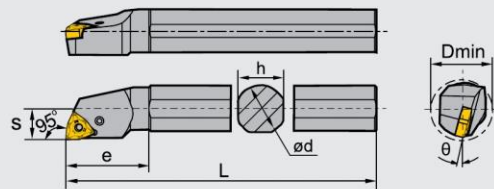
**A**

General turning

Internal turning tools

Corresponding tool holders of insert **WN** ☐ ☐ P-type clamping**PWLNR/L**  
Kr:95°

R-type shown



| Type            | Stock |   | Basic dimensions(mm) |    |    |     |    |      |    | Screw                                                                             | Wrench                                                                              | Lever                                                                               | Shim                                                                                | Shim pin                                                                            |
|-----------------|-------|---|----------------------|----|----|-----|----|------|----|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                 | R     | L | Dmin                 | ød | h  | L   | S  | θ    | e  |  |  |  |  |  |
| S16M-PWLNR/L06  | △     | △ | 20                   | 16 | 15 | 150 | 11 | -13° | 25 | LEM5X12B                                                                          | WH20L                                                                               | L3B                                                                                 | —                                                                                   | —                                                                                   |
| S16R-PWLNR/L06  | △     | △ | 20                   | 16 | 15 | 200 | 11 | -13° | 25 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S20Q-PWLNR/L06  | △     | △ | 25                   | 20 | 18 | 180 | 13 | -13° | 35 | LEM5X12B                                                                          | WH20L                                                                               | L3B                                                                                 | —                                                                                   | —                                                                                   |
| S20S-PWLNR/L06  | △     | △ | 25                   | 20 | 18 | 250 | 13 | -13° | 35 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S25Q-PWLNR/L06  | △     | △ | 32                   | 25 | 23 | 180 | 17 | -13° | 35 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S25T-PWLNR/L06  | △     | △ | 32                   | 25 | 23 | 300 | 17 | -13° | 35 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S20Q-PWLNR/L08  | △     | △ | 25                   | 20 | 18 | 180 | 13 | -13° | 32 | LEM6X13.4A                                                                        | WH25L                                                                               | L4A                                                                                 | —                                                                                   | —                                                                                   |
| S20S-PWLNR/L08  | △     | △ | 25                   | 20 | 18 | 250 | 13 | -13° | 32 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S25Q-PWLNR/L08  | △     | △ | 32                   | 25 | 23 | 180 | 17 | -13° | 45 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S25T-PWLNR/L08  | △     | △ | 32                   | 25 | 23 | 300 | 17 | -13° | 45 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| S32R-PWLNR/L08  | △     | △ | 40                   | 32 | 30 | 200 | 22 | -15° | 50 | LEM8X21                                                                           | WH30L                                                                               | L4                                                                                  | W08AP                                                                               | SP4                                                                                 |
| S32U-PWLNR/L08  | △     | △ | 40                   | 32 | 30 | 350 | 22 | -15° | 50 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| ※A25T-PWLNR/L08 | △     | △ | 32                   | 25 | 23 | 300 | 17 | -13° | 45 | LEM6X13.4A                                                                        | WH25L                                                                               | L4A                                                                                 | —                                                                                   | —                                                                                   |
| ※A32R-PWLNR/L08 | △     | △ | 40                   | 32 | 30 | 200 | 22 | -15° | 50 | LEM8X21                                                                           | WH30L                                                                               | L4                                                                                  | W08AP                                                                               | SP4                                                                                 |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

## Applicable inserts

| Application      | For finishing      |                                                                                         | For semi-finishing |                                                                                         | For roughing             |                                                                                           | For cast iron machining |                                                                                           |
|------------------|--------------------|-----------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------------------------------------------------|
| Inserts shape    | <b>DF</b>          |  A74 | <b>DM</b>          |  A76 | <b>DR</b><br>Double side |  A77 | Without chipbreaker     |  A77 |
|                  | <b>WG</b><br>Wiper |  A74 | <b>PM</b>          |  A76 |                          |                                                                                           |                         |                                                                                           |
|                  | <b>SF</b>          |  A75 | <b>EM</b>          |  A76 |                          |                                                                                           |                         |                                                                                           |
|                  | <b>EF</b>          |  A75 | <b>NM</b>          |  A77 |                          |                                                                                           |                         |                                                                                           |
|                  | <b>NF</b>          |  A75 |                    |                                                                                         |                          |                                                                                           |                         |                                                                                           |
| Tool holder type | □□-PWLNR/L06       |                                                                                         | WN□□0604□□         |                                                                                         | WN□□0604□□               |                                                                                           | WN□□0604□□              |                                                                                           |
|                  | □□-PWLNR/L08       |                                                                                         | WN□□0804□□         |                                                                                         | WN□□0804□□               |                                                                                           | WN□□0804□□              |                                                                                           |

# General Turning Tools

Internal turning tools

# TURNING

## Corresponding tool holders of insert CC □ □

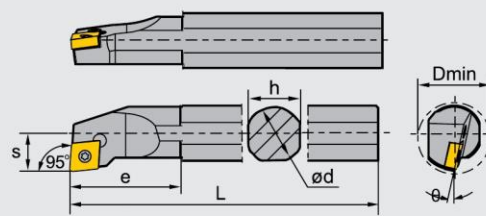
S-type clamping

### SCLCR/L

Kr:95°



R-type shown



| Type            | Stock |   | Basic dimensions(mm) |    |      |     |    |      |      | Screw                                                                             | Wrench                                                                              | Shim                                                                                | Shim screw                                                                          |
|-----------------|-------|---|----------------------|----|------|-----|----|------|------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                 | R     | L | Dmin                 | ød | h    | L   | S  | θ    | e    |  |  |  |  |
| S08K-SCLCR/L06  | ▲     | ▲ | 10                   | 8  | 7    | 125 | 5  | -15° | 14   | I60M2.5×5.5                                                                       | WT07IP                                                                              | —                                                                                   | —                                                                                   |
| S10M-SCLCR/L06  | ▲     | ▲ | 12                   | 10 | 9    | 150 | 6  | -13° | 14   |                                                                                   |                                                                                     | —                                                                                   | —                                                                                   |
| S12M-SCLCR/L06  | ▲     | ▲ | 16                   | 12 | 11   | 150 | 9  | -10° | 25   |                                                                                   |                                                                                     | —                                                                                   | —                                                                                   |
| S12M-SCLCR/L09  | ▲     | ▲ | 16                   | 12 | 11   | 150 | 9  | -10° | 25   | I60M3.5×8                                                                         | WT15IP                                                                              | —                                                                                   | —                                                                                   |
| S16M-SCLCR/L09  | △     | △ | 20                   | 16 | 15   | 150 | 11 | -12° | 32.5 |                                                                                   |                                                                                     | —                                                                                   | —                                                                                   |
| S16R-SCLCR/L09  | ▲     | ▲ | 20                   | 16 | 15   | 200 | 11 | -12° | 32.5 |                                                                                   |                                                                                     | —                                                                                   | —                                                                                   |
| S20Q-SCLCR/L09  | △     | △ | 25                   | 20 | 18   | 180 | 13 | -8°  | 38   |                                                                                   |                                                                                     | —                                                                                   | —                                                                                   |
| S20S-SCLCR/L09  | ▲     | ▲ | 25                   | 20 | 18   | 250 | 13 | -8°  | 38   | I60M3.5×10                                                                        | WT15IP                                                                              | —                                                                                   | —                                                                                   |
| S25Q-SCLCR/L09  | △     | △ | 32                   | 25 | 23   | 180 | 17 | -6°  | 45   |                                                                                   |                                                                                     | —                                                                                   | —                                                                                   |
| S25T-SCLCR/L09  | ▲     | ▲ | 32                   | 25 | 23   | 300 | 17 | -6°  | 45   | I60M4×11X                                                                         | WT15IP                                                                              | —                                                                                   | —                                                                                   |
| S25Q-SCLCR/L12  | △     | △ | 32                   | 25 | 23   | 180 | 17 | -6°  | 45   | I60M4×11X                                                                         | WT15IP                                                                              | —                                                                                   | —                                                                                   |
| S25T-SCLCR/L12  | ▲     | ▲ | 32                   | 25 | 23   | 300 | 17 | -6°  | 45   | I60M4×11X                                                                         | WT15IP                                                                              | —                                                                                   | —                                                                                   |
| S32R-SCLCR/L12  | △     | △ | 40                   | 32 | 30   | 200 | 22 | -10° | 50   | I60M4×11X                                                                         | WH40L<br>WT15IP                                                                     | C12BS                                                                               | SM6×10XA                                                                            |
| S32U-SCLCR/L12  | ▲     | ▲ | 40                   | 32 | 30   | 350 | 22 | -10° | 50   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| S40S-SCLCR/L12  | △     | △ | 50                   | 40 | 37   | 250 | 27 | -8°  | 60   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| S40V-SCLCR/L12  | ▲     | ▲ | 50                   | 40 | 37   | 400 | 27 | -8°  | 60   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| ※A08F-SCLCR/L06 | ▲     | ▲ | 10                   | 8  | 7.5  | 80  | 5  | -15° | 14   | I60M2.5×5.5                                                                       | WT07IP                                                                              | —                                                                                   | —                                                                                   |
| ※A10H-SCLCR/L06 | ▲     | ▲ | 12                   | 10 | 9.5  | 100 | 6  | -13° | 14   |                                                                                   |                                                                                     | —                                                                                   | —                                                                                   |
| ※A12K-SCLCR/L06 | ▲     | ▲ | 16                   | 12 | 11.5 | 125 | 9  | -10° | 25   |                                                                                   |                                                                                     | —                                                                                   | —                                                                                   |
| ※A12K-SCLCR/L09 | ▲     | ▲ | 16                   | 12 | 11.5 | 125 | 9  | -10° | 25   | I60M3.5×8                                                                         | WT15IP                                                                              | —                                                                                   | —                                                                                   |
| ※A16M-SCLCR/L09 | ▲     | ▲ | 20                   | 16 | 15.5 | 150 | 11 | -12° | 32.5 |                                                                                   |                                                                                     | —                                                                                   | —                                                                                   |
| ※A20Q-SCLCR/L09 | ▲     | ▲ | 25                   | 20 | 19   | 180 | 13 | -8°  | 38   | I60M3.5×10                                                                        | WT15IP                                                                              | —                                                                                   | —                                                                                   |
| ※A25R-SCLCR/L09 | ▲     | ▲ | 32                   | 25 | 24   | 200 | 17 | -6°  | 45   |                                                                                   |                                                                                     | —                                                                                   | —                                                                                   |
| ※A25R-SCLCR/L12 | ▲     | ▲ | 32                   | 25 | 24   | 200 | 17 | -6°  | 45   | I60M4×11X                                                                         | WT15IP                                                                              | —                                                                                   | —                                                                                   |
| ※A32S-SCLCR/L12 | ▲     | ▲ | 40                   | 32 | 31   | 250 | 22 | -10° | 50   |                                                                                   | WH40L<br>WT15IP                                                                     | C12BS                                                                               | SM6×10XA                                                                            |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

### Applicable inserts

| Application      | For extra finishing                                                                        | For finishing                                                                              | For semi-finishing                                                                         | For roughing                                                                                | For Al machining                                                                             | For cast iron machining                                                                                          |
|------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Inserts shape    | SF  A80 | HF  A80 | HM  A81 | HR  A82 | LH  A82 | Without chipbreaker<br> A83 |
|                  |                                                                                            | EF  A81 | EM  A81 |                                                                                             | LC  A82 |                                                                                                                  |
| Tool holder type | □□-SCLCR/L06                                                                               | CC□□0602□□                                                                                 | CC□□0602□□                                                                                 | CC□□0602□□                                                                                  | CC□□0602□□                                                                                   | CCGX0602□□                                                                                                       |
|                  | □□-SCLCR/L09                                                                               | CC□□09T3□□                                                                                 | CC□□09T3□□                                                                                 | CC□□09T3□□                                                                                  | CC□□09T3□□                                                                                   | CCGX09T3□□                                                                                                       |
|                  | □□-SCLCR/L12                                                                               | CC□□1204□□                                                                                 | CC□□1204□□                                                                                 | CC□□1204□□                                                                                  | CC□□1204□□                                                                                   | CCGX1204□□                                                                                                       |

#### Corresponding tool holders of insert **DC** ☐ ☐

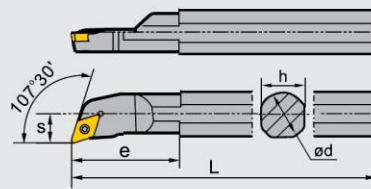
S-type clamping

#### SDQCR/L

Kr:107°30'



R-type shown



| Type            | Stock |   | Basic dimensions(mm) |    |      |     |    |     |    | Screw                                                                             | Wrench                                                                              |        |  |
|-----------------|-------|---|----------------------|----|------|-----|----|-----|----|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|--|
|                 | R     | L | Dmin                 | ød | h    | L   | S  | θ   | e  |  |  |        |  |
| S10M-SDQCR/L07  | ▲     | ▲ | 13                   | 10 | 9    | 150 | 7  | -8° | 20 | I60M2.5×5.5                                                                       |  | WT07IP |  |
| S12M-SDQCR/L07  | ▲     | ▲ | 16                   | 12 | 11   | 150 | 9  | -8° | 22 |                                                                                   |                                                                                     |        |  |
| S16M-SDQCR/L07  | △     | △ | 20                   | 16 | 15   | 150 | 11 | -6° | 27 |                                                                                   |                                                                                     |        |  |
| S16R-SDQCR/L07  | ▲     | ▲ | 20                   | 16 | 15   | 200 | 11 | -6° | 27 |                                                                                   |                                                                                     |        |  |
| S20Q-SDQCR/L11  | △     | △ | 25                   | 20 | 18   | 180 | 13 | -6° | 32 | I60M3.5×8                                                                         |  | WT15IP |  |
| S20S-SDQCR/L11  | ▲     | ▲ | 25                   | 20 | 18   | 250 | 13 | -6° | 32 |                                                                                   |                                                                                     |        |  |
| S25Q-SDQCR/L11  | △     | △ | 32                   | 25 | 23   | 180 | 17 | -6° | 32 | I60M3.5×10                                                                        |                                                                                     |        |  |
| S25T-SDQCR/L11  | ▲     | ▲ | 32                   | 25 | 23   | 300 | 17 | -6° | 32 |                                                                                   |                                                                                     |        |  |
| ※A10H-SDQCR/L07 | ▲     | △ | 13                   | 10 | 9.5  | 100 | 7  | -8° | 20 | I60M2.5×5.5                                                                       |  | WT07IP |  |
| ※A12K-SDQCR/L07 | ▲     | ▲ | 16                   | 12 | 11.5 | 125 | 9  | -8° | 22 | I60M2.5×6.5                                                                       |                                                                                     |        |  |
| ※A16M-SDQCR/L11 | ▲     | △ | 20                   | 16 | 15.5 | 150 | 11 | -6° | 27 | I60M3.5×8                                                                         |  | WT15IP |  |
| ※A20Q-SDQCR/L11 | ▲     | ▲ | 25                   | 20 | 19   | 180 | 13 | -6° | 32 |                                                                                   |                                                                                     |        |  |
| ※A25R-SDQCR/L11 | ▲     | ▲ | 32                   | 25 | 24   | 200 | 17 | -6° | 32 | I60M3.5×10                                                                        |                                                                                     |        |  |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

#### Applicable inserts

| Application      | For extra finishing                                                                        | For finishing                                                                              | For semi-finishing                                                                         | For roughing                                                                                | For Al machining                                                                             | For cast iron machining                                                                                       |
|------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Inserts shape    | SF  A84 | HF  A84 | HM  A85 | HR  A86 | LH  A86 | Without chipbreaker  A86 |
|                  |                                                                                            | EF  A85 | EM  A85 |                                                                                             | LC  A86 |                                                                                                               |
| Tool holder type | □□-SDQCR/L07                                                                               | DC□□0702□□                                                                                 | DC□□0702□□                                                                                 | DC□□0702□□                                                                                  | DCGX0702□□                                                                                   | DC□□0702□□                                                                                                    |
|                  | □□-SDQCR/L11                                                                               | DC□□11T3□□                                                                                 | DC□□11T3□□                                                                                 | DC□□11T3□□                                                                                  | DCGX11T3□□                                                                                   | DC□□11T3□□                                                                                                    |

# General Turning Tools

Internal turning tools

# TURNING

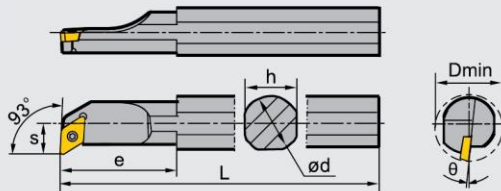
## Corresponding tool holders of insert DC

S-type clamping

**SDUCR/L**  
Kr:93°



R-type shown



| Type            | Stock |   | Basic dimensions(mm) |    |      |     |    |     |    | Screw                                                                             | Wrench                                                                              |        |  |
|-----------------|-------|---|----------------------|----|------|-----|----|-----|----|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|--|
|                 | R     | L | Dmin                 | ød | h    | L   | S  | θ   | e  |  |  |        |  |
| S10M-SDUCR/L07  | ▲     | ▲ | 13                   | 10 | 9    | 150 | 7  | -8° | 0  | I60M2.5×5.5                                                                       |  | WT07IP |  |
| S12M-SDUCR/L07  | ▲     | ▲ | 16                   | 12 | 11   | 150 | 9  | -8° | 22 |                                                                                   |                                                                                     |        |  |
| S16M-SDUCR/L07  | △     | △ | 20                   | 16 | 15   | 150 | 11 | -6° | 27 |                                                                                   |                                                                                     |        |  |
| S16R-SDUCR/L07  | ▲     | ▲ | 20                   | 16 | 15   | 200 | 11 | -6° | 27 |                                                                                   |                                                                                     |        |  |
| S20Q-SDUCR/L11  | △     | △ | 25                   | 20 | 18   | 180 | 13 | -6° | 40 | I60M3.5×8                                                                         |  | WT15IP |  |
| S20S-SDUCR/L11  | ▲     | ▲ | 25                   | 20 | 18   | 250 | 13 | -6° | 40 |                                                                                   |                                                                                     |        |  |
| S25Q-SDUCR/L11  | △     | △ | 32                   | 25 | 23   | 180 | 17 | -6° | 46 | I60M3.5×10                                                                        |                                                                                     |        |  |
| S25T-SDUCR/L11  | ▲     | ▲ | 32                   | 25 | 23   | 300 | 17 | -6° | 46 |                                                                                   |                                                                                     |        |  |
| ※A10H-SDUCR/L07 | ▲     | ▲ | 13                   | 10 | 9.5  | 100 | 7  | -8° | 0  | I60M2.5×5.5                                                                       |  | WT07IP |  |
| ※A12K-SDUCR/L07 | △     | ▲ | 16                   | 12 | 11.5 | 125 | 9  | -8° | 22 | I60M2.5×6.5                                                                       |                                                                                     |        |  |
| ※A16M-SDUCR/L07 | ▲     | ▲ | 20                   | 16 | 15.5 | 150 | 11 | -6° | 27 |                                                                                   |                                                                                     |        |  |
| ※A20Q-SDUCR/L11 | ▲     | ▲ | 25                   | 20 | 19   | 180 | 13 | -6° | 40 | I60M3.5×8                                                                         |  | WT15IP |  |
| ※A25R-SDUCR/L11 | ▲     | ▲ | 32                   | 25 | 24   | 200 | 17 | -6° | 46 | I60M3.5×10                                                                        |                                                                                     |        |  |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

## Applicable inserts

| Application      | For extra finishing                                                                        | For finishing                                                                              | For semi-finishing                                                                         | For roughing                                                                                | For Al machining                                                                             | For cast iron machining                                                                                          |
|------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Inserts shape    | SF  A84 | HF  A84 | HM  A85 | HR  A86 | LH  A86 | Without chipbreaker<br> A86 |
|                  |                                                                                            | EF  A85 | EM  A85 |                                                                                             | LC  A86 |                                                                                                                  |
| Tool holder type | □□-SDUCR/L07                                                                               | DC□□0702□□                                                                                 | DC□□0702□□                                                                                 | DC□□0702□□                                                                                  | DCGX0702□□                                                                                   | DC□□0702□□                                                                                                       |
|                  | □□-SDUCR/L11                                                                               | DC□□11T3□□                                                                                 | DC□□11T3□□                                                                                 | DC□□11T3□□                                                                                  | DCGX11T3□□                                                                                   | DC□□11T3□□                                                                                                       |

A

General turning

Internal turning tools

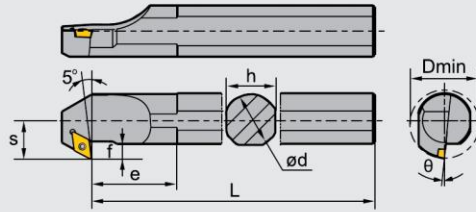
### Corresponding tool holders of insert DC

S-type clamping

#### SDZCR/L Kr:95°



R-type shown



| Type            | Stock |   | Basic dimensions(mm) |    |    |     |    |     |    |     | Screw      | Wrench          | Shim  | Shim screw |
|-----------------|-------|---|----------------------|----|----|-----|----|-----|----|-----|------------|-----------------|-------|------------|
|                 | R     | L | Dmin                 | ød | h  | L   | S  | θ   | e  | f   |            |                 |       |            |
| S25Q-SDZCR/L11  | △     | △ | 32                   | 25 | 23 | 180 | 17 | -6° | 30 | 6.9 | I60M3.5×10 | WT15IP          | ---   | ---        |
| S25T-SDZCR/L11  | ▲     | ▲ | 32                   | 25 | 23 | 300 | 17 | -6° | 30 | 6.9 |            |                 |       |            |
| S32R-SDZCR/L11  | △     | △ | 40                   | 32 | 30 | 200 | 22 | -6° | 39 | 8.4 | I60M3.5×12 | WT15IP<br>WH35L | D11BS | SM5×8.65XA |
| S32U-SDZCR/L11  | ▲     | ▲ | 40                   | 32 | 30 | 350 | 22 | -6° | 39 | 8.4 |            |                 |       |            |
| S40S-SDZCR/L11  | △     | △ | 50                   | 40 | 37 | 250 | 27 | -4° | 47 | 9.4 |            |                 |       |            |
| S40V-SDZCR/L11  | ▲     | ▲ | 50                   | 40 | 37 | 400 | 27 | -4° | 47 | 9.4 |            |                 |       |            |
| ※A25R-SDZCR/L11 | ▲     | △ | 32                   | 25 | 24 | 200 | 17 | -6° | 30 | 4.5 | I60M3.5×10 | WT15IP          |       |            |
| ※A32S-SDZCR/L11 | △     | △ | 40                   | 32 | 31 | 250 | 22 | -6° | 39 | 6.0 | I60M3.5×12 | WT15IP<br>WH35L | D11BS | SM5×8.65XA |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

#### Applicable inserts

| Application      | For extra finishing                                                                        | For finishing                                                                              | For semi-finishing                                                                         | For roughing                                                                                | For Al machining                                                                             | For cast iron machining                                                                                       |
|------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Inserts shape    | SF  A84 | HF  A84 | HM  A85 | HR  A86 | LH  A86 | Without chipbreaker  A86 |
|                  |                                                                                            | EF  A85 | EM  A85 |                                                                                             | LC  A86 |                                                                                                               |
| Tool holder type | □□-SDZCR/L11                                                                               | DC□□11T3□□                                                                                 | DC□□11T3□□                                                                                 | DC□□11T3□□                                                                                  | DCGX11T3□□                                                                                   | DC□□11T3□□                                                                                                    |

# General Turning Tools

Internal turning tools

# TURNING

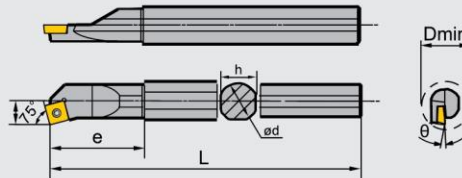
## Corresponding tool holders of insert SC□□

S-type clamping

**SSKCR/L**  
Kr:75°



R-type shown



| Type            | Stock |   | Basic dimensions(mm) |    |    |     |    |     |      | Screw                                                                             | Wrench                                                                              | Shim                                                                                | Shim screw                                                                          |
|-----------------|-------|---|----------------------|----|----|-----|----|-----|------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                 | R     | L | Dmin                 | ød | h  | L   | S  | θ   | e    |  |  |  |  |
| S12M-SSKCR/L09  | ▲     | △ | 16                   | 12 | 11 | 150 | 9  | -10 | 26   | I60M3.5×8                                                                         | WT15IP                                                                              | ---                                                                                 | ---                                                                                 |
| S16M-SSKCR/L09  | △     | △ | 20                   | 16 | 15 | 150 | 11 | -11 | 32.5 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| S16R-SSKCR/L09  | ▲     | ▲ | 20                   | 16 | 15 | 200 | 11 | -11 | 32.5 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| S20Q-SSKCR/L09  | △     | △ | 25                   | 20 | 18 | 180 | 13 | -6  | 34.5 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| S20S-SSKCR/L09  | ▲     | △ | 25                   | 20 | 18 | 250 | 13 | -6  | 34.5 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| S25Q-SSKCR/L12  | △     | △ | 32                   | 25 | 23 | 180 | 17 | -8  | 36.3 | I60M4×11X                                                                         | WT15IP                                                                              | S12BS                                                                               | SM6×10XA                                                                            |
| S25T-SSKCR/L12  | ▲     | ▲ | 32                   | 25 | 23 | 300 | 17 | -8  | 36.3 |                                                                                   | WT15IP                                                                              |                                                                                     |                                                                                     |
| S32R-SSKCR/L12  | △     | △ | 40                   | 32 | 30 | 200 | 22 | -10 | 43.5 |                                                                                   | WT15IP<br>WH40L                                                                     |                                                                                     |                                                                                     |
| S32U-SSKCR/L12  | ▲     | △ | 40                   | 32 | 30 | 350 | 22 | -10 | 43.5 | I60M3.5×8                                                                         | WT15IP                                                                              | ---                                                                                 | ---                                                                                 |
| ※A12K-SSKCR/L09 | △     | △ | 16                   | 12 | 11 | 125 | 9  | -10 | 26   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| ※A16M-SSKCR/L09 | △     | △ | 20                   | 16 | 15 | 150 | 11 | -11 | 32.5 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| ※A20Q-SSKCR/L09 | ▲     | △ | 25                   | 20 | 19 | 180 | 13 | -6  | 34.5 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| ※A25R-SSKCR/L12 | △     | △ | 32                   | 25 | 24 | 200 | 17 | -8  | 41.3 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| ※A32S-SSKCR/L12 | ▲     | △ | 40                   | 32 | 31 | 250 | 22 | -10 | 42.8 | I60M4×11X                                                                         | WT15IP<br>WH40L                                                                     | S12BS                                                                               | SM6×10XA                                                                            |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

## Applicable inserts

| Application      |              | For finishing                                                                           | For semi-finishing | For roughing                                                                            | For Al machining | For cast iron machining                                                                 |            |                                                                                           |                     |                                                                                           |
|------------------|--------------|-----------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------|
| Inserts shape    | HF           |  A89 | HM                 |  A89 | HR               |  A90 | LH         |  A90 | Without chipbreaker |  A90 |
|                  | EF           |  A89 | EM                 |  A89 |                  |                                                                                         | LC         |  A90 |                     |                                                                                           |
| Tool holder type | □□-SSKCR/L09 | SC□□09T3□□                                                                              |                    | SC□□09T3□□                                                                              | SC□□09T3□□       | SCGX09T3□□                                                                              | SC□□09T3□□ |                                                                                           |                     |                                                                                           |
|                  | □□-SSKCR/L12 | SC□□1204□□                                                                              |                    | SC□□1204□□                                                                              | SCGX1204□□       | SC□□1204□□                                                                              |            |                                                                                           |                     |                                                                                           |

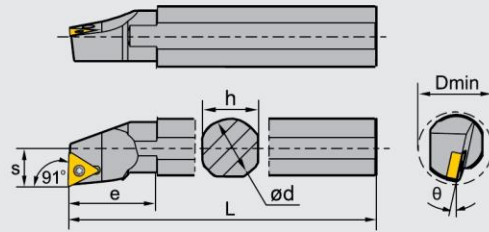
### Corresponding tool holders of insert **TC** □ □

S-type clamping

#### STFCR/L Kr:91°



R-type shown



| Type            | Stock |   | Basic dimensions(mm) |    |      |     |    |      |    | Screw       | Wrench          | Shim  | Shim screw |
|-----------------|-------|---|----------------------|----|------|-----|----|------|----|-------------|-----------------|-------|------------|
|                 | R     | L | Dmin                 | ød | h    | L   | S  | θ    | e  |             |                 |       |            |
| S12M-STFCR/L11  | ▲     | ▲ | 16                   | 12 | 11   | 150 | 9  | -10° | 30 | I60M2.5×6.5 | WT07IP          | ---   | ---        |
| S16M-STFCR/L11  | △     | △ | 20                   | 16 | 15   | 150 | 11 | -6°  | 35 |             |                 |       |            |
| S16R-STFCR/L11  | ▲     | ▲ | 20                   | 16 | 15   | 200 | 11 | -6°  | 35 |             |                 |       |            |
| S20Q-STFCR/L11  | △     | △ | 25                   | 20 | 18   | 180 | 13 | -3°  | 36 |             |                 |       |            |
| S20S-STFCR/L11  | ▲     | ▲ | 25                   | 20 | 18   | 250 | 13 | -3°  | 36 |             |                 |       |            |
| S25Q-STFCR/L16  | △     | △ | 32                   | 25 | 23   | 180 | 17 | -6°  | 49 | I60M3.5×10  | WT15IP          |       |            |
| S25T-STFCR/L16  | ▲     | ▲ | 32                   | 25 | 23   | 300 | 17 | -6°  | 49 |             |                 |       |            |
| S32R-STFCR/L16  | △     | △ | 40                   | 32 | 30   | 200 | 22 | -10° | 50 | I60M3.5×12  | WT15IP<br>WH35L | T16BS | SM5×8.65XA |
| S32U-STFCR/L16  | ▲     | ▲ | 40                   | 32 | 30   | 350 | 22 | -10° | 50 |             |                 |       |            |
| S40S-STFCR/L16  | △     | △ | 50                   | 40 | 37   | 250 | 27 | -8°  | 60 |             |                 |       |            |
| S40V-STFCR/L16  | ▲     | ▲ | 50                   | 40 | 37   | 400 | 27 | -8°  | 60 |             |                 |       |            |
| ※A12K-STFCR/L11 | ▲     | △ | 16                   | 12 | 11.5 | 125 | 9  | -10° | 26 | I60M2.5×6.5 | WT07IP          | ---   | ---        |
| ※A16M-STFCR/L11 | ▲     | △ | 20                   | 16 | 15.5 | 150 | 11 | -6°  | 30 |             |                 |       |            |
| ※A20Q-STFCR/L11 | ▲     | △ | 25                   | 20 | 19   | 180 | 13 | -3°  | 36 |             |                 |       |            |
| ※A25R-STFCR/L16 | ▲     | ▲ | 32                   | 25 | 24   | 200 | 17 | -6°  | 45 | I60M3.5×10  | WT15IP          |       |            |
| ※A32S-STFCR/L16 | △     | △ | 40                   | 32 | 31   | 250 | 22 | -10° | 49 | I60M3.5×12  | WT15IP          | T16BS | SM5×8.65XA |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

#### Applicable inserts

| Application      |                                                                                               | For finishing                                                                                 | For semi-finishing                                                                            | For roughing                                                                                    | For Al machining                                                                                                 | For cast iron machining |
|------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------|
| Inserts shape    | HF<br> A91 | HM<br> A93 | HR<br> A93 | LH<br> A94 | Without chipbreaker<br> A94 |                         |
|                  | EF<br> A92 | EM<br> A92 |                                                                                               | LC<br> A93 |                                                                                                                  |                         |
| Tool holder type | □□-STFCR/L11                                                                                  | TC□□1102□□                                                                                    | TC□□1102□□                                                                                    | TC□□1102□□                                                                                      | TCGX1102□□                                                                                                       | TC□□1102□□              |
|                  | □□-STFCR/L16                                                                                  | TC□□16T3□□                                                                                    | TC□□16T3□□                                                                                    | TC□□16T3□□                                                                                      | TCGX16T3□□                                                                                                       | TC□□16T3□□              |

# General Turning Tools

Internal turning tools

# TURNING

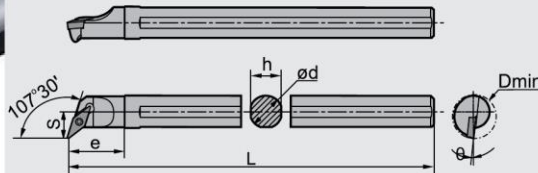
## Corresponding tool holders of insert VC□□

S-type clamping

**SVQCR/L**  
Kr:107°30'



R-type shown



| Type                  | Stock |   | Basic dimensions(mm) |    |    |     |    |     |    | Screw       | Wrench |  |  |
|-----------------------|-------|---|----------------------|----|----|-----|----|-----|----|-------------|--------|--|--|
|                       | R     | L | Dmin                 | ød | h  | L   | S  | θ   | e  |             |        |  |  |
| <b>S16Q-SVQCR/L11</b> | ▲     | ▲ | 22                   | 16 | 15 | 180 | 13 | -6° | 28 | I60M2.5×6.5 | WT07IP |  |  |
| <b>S20R-SVQCR/L11</b> | △     | △ | 26                   | 20 | 18 | 200 | 15 | -4° | 32 |             |        |  |  |

▲ Stock available

△ Make-to-order

## Applicable inserts

| Application      |              | For extra finishing                                                                                     | For finishing                                                                                           | For AI machining                                                                                          |
|------------------|--------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Inserts shape    |              | <b>SF</b><br><br>A95 | <b>HF</b><br><br>A95 | <b>LH</b><br><br>A96 |
| Tool holder type | □□-SVQCR/L11 | VC□□1103□□                                                                                              | VC□□1103□□                                                                                              | VCGX1103□□                                                                                                |
|                  |              |                                                                                                         |                                                                                                         |                                                                                                           |

A

General turning

Internal turning tools

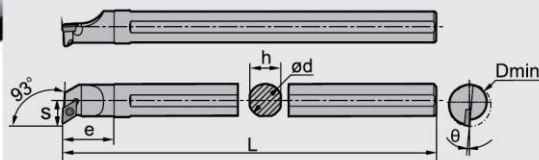
### Corresponding tool holders of insert **VC** ☐ ☐

S-type clamping

#### SVUCR/L Kr:93°



R-type shown



| Type                  | Stock |   | Basic dimensions(mm) |    |    |     |    |     |    | Screw                                                                             | Wrench                                                                              |  |  |
|-----------------------|-------|---|----------------------|----|----|-----|----|-----|----|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|--|
|                       | R     | L | Dmin                 | ød | h  | L   | S  | θ   | e  |                                                                                   |                                                                                     |  |  |
| <b>S16Q-SVUCR/L11</b> | △     | △ | 24                   | 16 | 15 | 180 | 15 | -6° | 25 |  |  |  |  |
| <b>S20R-SVUCR/L11</b> | △     | △ | 28                   | 20 | 18 | 200 | 17 | -4° | 30 |                                                                                   |                                                                                     |  |  |

▲ Stock available

△ Make-to-order

#### Applicable inserts

| Application      | For extra finishing                                          |                                                                                         | For finishing                                                                                               |                                                                                         | For AI machining                                           |                                                                                          |
|------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Inserts shape    | <b>SF</b>                                                    |  A95 | <b>HF</b>                                                                                                   |  A95 | <b>LH</b>                                                  |  A96 |
| Tool holder type | <input type="checkbox"/> <input type="checkbox"/> -SVUCR/L11 |                                                                                         | VC <input type="checkbox"/> <input type="checkbox"/> 1103 <input type="checkbox"/> <input type="checkbox"/> |                                                                                         | VCGX1103 <input type="checkbox"/> <input type="checkbox"/> |                                                                                          |

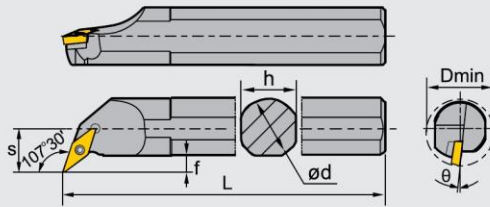
### Corresponding tool holders of insert **VB** □ □

S-type clamping

**SVQBR/L**  
Kr:107°30'



R-type shown



| Type             | Stock |   | Basic dimensions(mm) |    |    |     |    |     |    |     | Screw                                                                             | Wrench                                                                              | Shim                                                                                | Shim screw                                                                          |
|------------------|-------|---|----------------------|----|----|-----|----|-----|----|-----|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                  | R     | L | Dmin                 | ød | h  | L   | S  | θ   | e  | f   |  |  |  |  |
| S32RSVQBR/L16    | △     | △ | 40                   | 32 | 30 | 200 | 22 | -8° | 56 | 8.4 | I60M3.5×12                                                                        | WT15IP<br>WH35L                                                                     | V16BS                                                                               | SM5×8.65XA                                                                          |
| S32U-SVQBR/L16   | ▲     | ▲ | 40                   | 32 | 30 | 350 | 22 | -8° | 56 | 8.4 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| S40S-SVQBR/L16   | △     | △ | 50                   | 40 | 37 | 250 | 27 | -8° | 64 | 9.4 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| S40V-SVQBR/L16   | ▲     | ▲ | 50                   | 40 | 37 | 400 | 27 | -8° | 64 | 9.4 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| ※A32S- SVQBR/L16 | ▲     | △ | 40                   | 32 | 31 | 250 | 22 | -8° | 56 | 8.4 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

### Applicable inserts

| Application      | For finishing                                                                              | For semi-finishing                                                                         | For roughing                                                                                 |
|------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Inserts shape    | EF  A98 | HM  A99 | HR  A99 |
|                  | NF  A98 |                                                                                            |                                                                                              |
| Tool holder type | □□-SVQBR/L16                                                                               | VB□□1604□□                                                                                 | VB□□1604□□                                                                                   |
|                  |                                                                                            |                                                                                            |                                                                                              |
|                  |                                                                                            |                                                                                            |                                                                                              |

A

General turning

Internal turning tools

### Corresponding tool holders of insert **VB** ☐ ☐

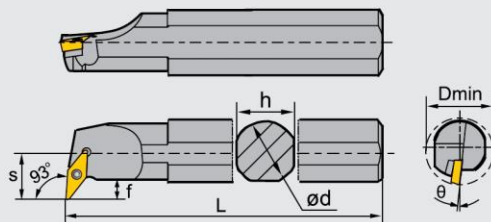
S-type clamping

#### SVUBR/L

Kr:93°



R-type shown



| Type             | Stock |   | Basic dimensions(mm) |    |    |     |    |     |      |     | Screw                                                                             | Wrench                                                                              | Shim                                                                                | Shim screw                                                                          |
|------------------|-------|---|----------------------|----|----|-----|----|-----|------|-----|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                  | R     | L | Dmin                 | ød | h  | L   | S  | θ   | e    | f   |  |  |  |  |
| S32R-SVUBR/L16   | △     | △ | 40                   | 32 | 30 | 200 | 22 | -8° | 49   | 8.4 | I60M3.5×12                                                                        | WT151P<br>WH35L                                                                     | V16BS                                                                               | SM5×8.65XA                                                                          |
| S32U-SVUBR/L16   | ▲     | ▲ | 40                   | 32 | 30 | 350 | 22 | -8° | 49   | 8.4 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| S40S- SVUBR/L16  | △     | △ | 50                   | 40 | 37 | 250 | 27 | -8° | 56.5 | 9.4 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| S40V- SVUBR/L16  | ▲     | ▲ | 50                   | 40 | 37 | 400 | 27 | -8° | 56.5 | 9.4 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| ※A32S- SVUBR/L16 | ▲     | ▲ | 40                   | 32 | 31 | 250 | 22 | -8° | 49   | 8.4 |                                                                                   |                                                                                     |                                                                                     |                                                                                     |

※ Tool holders with oil hole

▲ Stock available

△ Make-to-order

#### Applicable inserts

| Application      | For finishing |                                                                                         | For semi-finishing |                                                                                         | For roughing |                                                                                           |
|------------------|---------------|-----------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------------|
| Inserts shape    | HF            |  A98 | HM                 |  A99 | HR           |  A99 |
|                  | EF            |  A98 | EM                 |  A99 |              |                                                                                           |
|                  | NF            |  A98 |                    |                                                                                         |              |                                                                                           |
| Tool holder type | □□-SVUBR/L16  |                                                                                         | VB□□1604□□         |                                                                                         | VB□□1604□□   |                                                                                           |
|                  |               |                                                                                         |                    |                                                                                         |              |                                                                                           |
|                  |               |                                                                                         |                    |                                                                                         |              |                                                                                           |

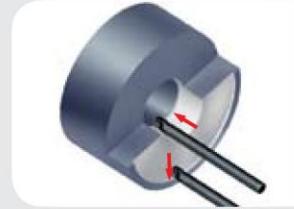
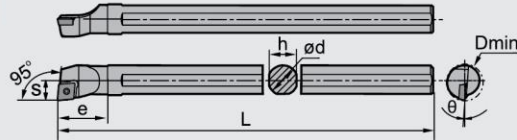
## Corresponding tool holders of insert CP

S-type clamping

### SCLPR/L Kr:95°



R-type shown



| Type           | Stock |   | Basic dimensions(mm) |    |    |     |    |     |    | Screw                                                                             | Wrench                                                                             |  |  |
|----------------|-------|---|----------------------|----|----|-----|----|-----|----|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--|--|
|                | R     | L | Dmin                 | ød | h  | L   | S  | θ   | e  |  |  |  |  |
| S10K-SCLPR/L06 | ▲     | ▲ | 12                   | 10 | 9  | 125 | 6  | -7° | 17 | I60M2.5×5.5                                                                       | WT07IP                                                                             |  |  |
| S12M-SCLPR/L06 | ▲     | ▲ | 16                   | 12 | 11 | 150 | 8  | -4° | 20 |                                                                                   |                                                                                    |  |  |
| S16Q-SCLPR/L09 | ▲     | ▲ | 20                   | 16 | 15 | 180 | 10 | -4° | 29 | I60M3.5×8                                                                         | WT15IP                                                                             |  |  |
| S20R-SCLPR/L09 | △     | △ | 25                   | 20 | 18 | 200 | 13 | -4° | 35 |                                                                                   |                                                                                    |  |  |

▲ Stock available

△ Make-to-order

### Applicable inserts

| Application      | For extra finishing                                                                    |
|------------------|----------------------------------------------------------------------------------------|
| Inserts shape    | SF  |
| Tool holder type | A100                                                                                   |
| □□-SCLPR/L06     | CP□□0602□□                                                                             |
| □□-SCLPR/L09     | CP□□09T3□□                                                                             |

A

General turning

Internal turning tools

#### Corresponding tool holders of insert DP

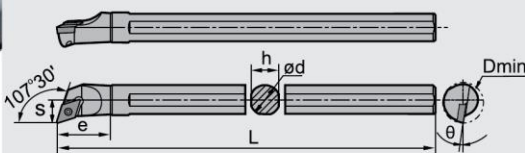
S-type clamping

#### SDQPR/L

Kr:107°30'



R-type shown



| Type           | Stock |   | Basic dimensions(mm) |    |    |     |    |     |    | Screw                                                                             | Wrench                                                                             |  |  |
|----------------|-------|---|----------------------|----|----|-----|----|-----|----|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--|--|
|                | R     | L | Dmin                 | ød | h  | L   | S  | θ   | e  |  |  |  |  |
| S10K-SDQPR/L07 | △     | △ | 13                   | 10 | 9  | 125 | 7  | -8° | 20 | I60M2.5×5.5                                                                       | WT07IP                                                                             |  |  |
| S12M-SDQPR/L07 | ▲     | △ | 16                   | 12 | 11 | 150 | 9  | -8° | 22 |                                                                                   |                                                                                    |  |  |
| S16Q-SDQPR/L07 | ▲     | △ | 20                   | 16 | 15 | 180 | 11 | -6° | 27 |                                                                                   |                                                                                    |  |  |
| S16Q-SDQPR/L11 | ▲     | △ | 20                   | 16 | 15 | 180 | 11 | -6° | 32 | I60M3.5×8                                                                         | WT15IP                                                                             |  |  |
| S20R-SDQPR/L11 | △     | △ | 25                   | 20 | 18 | 200 | 13 | -6° | 33 |                                                                                   |                                                                                    |  |  |

▲Stock available

△Make-to-order

#### Applicable inserts

| Application      | For extra finishing                                                                    |
|------------------|----------------------------------------------------------------------------------------|
| Inserts shape    | SF  |
| Tool holder type | A101                                                                                   |
| □□-SDQPR/L07     | DP□□0702□□                                                                             |
| □□-SDQPR/L11     | DP□□11T3□□                                                                             |

# General Turning Tools

Internal turning tools

# TURNING

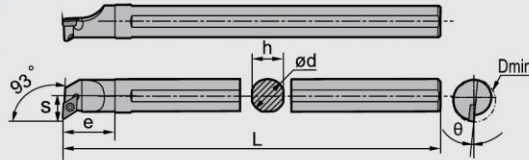
## Corresponding tool holders of insert DP

S-type clamping

**SDUPR/L**  
Kr:93°



R-type shown



| Type           | Stock |   | Basic dimensions(mm) |    |    |     |    |     |    | Screw                                                                             | Wrench                                                                             |  |  |
|----------------|-------|---|----------------------|----|----|-----|----|-----|----|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--|--|
|                | R     | L | Dmin                 | ød | h  | L   | S  | θ   | e  |  |  |  |  |
| S10K-SDUPR/L07 | ▲     | ▲ | 15                   | 10 | 9  | 125 | 9  | -8° | 18 | I60M2.5×5.5                                                                       | WT071P                                                                             |  |  |
| S12M-SDUPR/L07 | ▲     | △ | 16                   | 12 | 11 | 150 | 9  | -8° | 19 |                                                                                   |                                                                                    |  |  |
| S16Q-SDUPR/L07 | △     | △ | 20                   | 16 | 15 | 180 | 11 | -6° | 25 | I60M2.5×6.5                                                                       |                                                                                    |  |  |

▲Stock available

△Make-to-order

### Applicable inserts

| Application      | For extra finishing                                                                         |
|------------------|---------------------------------------------------------------------------------------------|
| Inserts shape    | SF  A101 |
| Tool holder type | DP□□0702□□                                                                                  |

A

General turning

Internal turning tools

### Corresponding tool holders of insert TP □ □

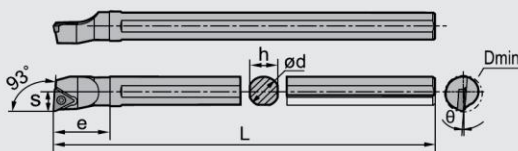
S-type clamping

#### STUPR/L

Kr:93°



R-type shown



| Type           | Stock |   | Basic dimensions(mm) |    |    |     |    |     |    | Screw       | Wrench |  |  |
|----------------|-------|---|----------------------|----|----|-----|----|-----|----|-------------|--------|--|--|
|                | R     | L | Dmin                 | ød | h  | L   | S  | θ   | e  |             |        |  |  |
| S10K-STUPR/L09 | ▲     | △ | 12                   | 10 | 9  | 125 | 6  | -6° | 20 | I60M2.2×5.5 | WT07IP |  |  |
| S12M-STUPR/L09 | ▲     | △ | 16                   | 12 | 11 | 150 | 8  | -4° | 22 |             |        |  |  |
| S12M-STUPR/L11 | ▲     | △ | 16                   | 12 | 11 | 150 | 8  | -4° | 25 | I60M2.5×6.5 | WT07IP |  |  |
| S16Q-STUPR/L11 | ▲     | △ | 20                   | 16 | 15 | 180 | 10 | -3° | 27 |             |        |  |  |

▲ Stock available

△ Make-to-order

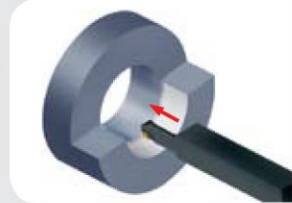
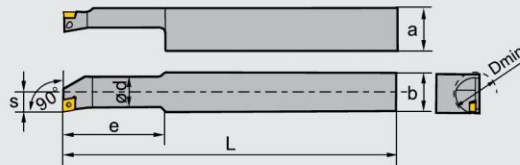
#### Applicable inserts

| Application      | For extra finishing |                                                                                     |
|------------------|---------------------|-------------------------------------------------------------------------------------|
| Inserts shape    | SF                  |  |
|                  |                     | A104                                                                                |
| Tool holder type | □□-STUPR/L09        | TP□□0902□□                                                                          |
|                  | □□-STUPR/L11        | TP□□1103□□                                                                          |

### Corresponding tool holders of insert **CC** ☐ ☐

S-type clamping

#### SCFCR Kr:90°



| Type            | Stock |   | Basic dimensions(mm) |    |     |    |    |    |    | Screw                                                                             | Wrench                                                                             |  |  |
|-----------------|-------|---|----------------------|----|-----|----|----|----|----|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--|--|
|                 | R     | L | Dmin                 | ød | L   | s  | a  | b  | e  |  |  |  |  |
| S10M-SCFCR06S25 | ▲     | △ | 13                   | 10 | 150 | 7  | 27 | 25 | 30 | I60M2.5×5.5                                                                       | WT07IP                                                                             |  |  |
| S12P-SCFCR06S25 | ▲     | △ | 16                   | 12 | 170 | 9  | 27 | 25 | 35 | I60M2.5×6.5                                                                       |                                                                                    |  |  |
| S16Q-SCFCR09S25 | △     | △ | 20                   | 16 | 180 | 11 | 27 | 25 | 40 | I60M3.5×8                                                                         | WT15IP                                                                             |  |  |
| S20R-SCFCR09S25 | ▲     | △ | 25                   | 20 | 200 | 13 | 27 | 25 | 45 |                                                                                   |                                                                                    |  |  |
| S25R-SCFCR12S25 | ▲     | △ | 32                   | 25 | 200 | 17 | 27 | 25 | 50 | I60M5×13                                                                          | WT20IP                                                                             |  |  |

▲ Stock available

△ Make-to-order

#### Applicable inserts

| Application      |                                                                                            | For extra finishing                                                                                         | For finishing                                                                                               | For semi-finishing                                                                                          | For roughing                                                                                                | For Al machining                                                                                                 | For cast iron machining                                                                                     |  |
|------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--|
| Inserts shape    | SF  A80 | HF  A80                  | HM  A81                  | HR  A82                 | LH  A82                | Without chipbreaker<br> A83 |                                                                                                             |  |
|                  |                                                                                            | EF  A81                  | EM  A81                  |                                                                                                             | LC  A82                |                                                                                                                  |                                                                                                             |  |
| Tool holder type | <input type="checkbox"/> -SCFCR06S25                                                       | CC <input type="checkbox"/> <input type="checkbox"/> 0602 <input type="checkbox"/> <input type="checkbox"/> | CC <input type="checkbox"/> <input type="checkbox"/> 0602 <input type="checkbox"/> <input type="checkbox"/> | CC <input type="checkbox"/> <input type="checkbox"/> 0602 <input type="checkbox"/> <input type="checkbox"/> | CC <input type="checkbox"/> <input type="checkbox"/> 0602 <input type="checkbox"/> <input type="checkbox"/> | CCGX0602 <input type="checkbox"/> <input type="checkbox"/>                                                       | CC <input type="checkbox"/> <input type="checkbox"/> 0602 <input type="checkbox"/> <input type="checkbox"/> |  |
|                  | <input type="checkbox"/> -SCFCR09S25                                                       | CC <input type="checkbox"/> <input type="checkbox"/> 09T3 <input type="checkbox"/> <input type="checkbox"/> | CC <input type="checkbox"/> <input type="checkbox"/> 09T3 <input type="checkbox"/> <input type="checkbox"/> | CC <input type="checkbox"/> <input type="checkbox"/> 09T3 <input type="checkbox"/> <input type="checkbox"/> | CC <input type="checkbox"/> <input type="checkbox"/> 09T3 <input type="checkbox"/> <input type="checkbox"/> | CCGX09T3 <input type="checkbox"/> <input type="checkbox"/>                                                       | CC <input type="checkbox"/> <input type="checkbox"/> 09T3 <input type="checkbox"/> <input type="checkbox"/> |  |
|                  | <input type="checkbox"/> -SCFCR12S25                                                       | CC <input type="checkbox"/> <input type="checkbox"/> 1204 <input type="checkbox"/> <input type="checkbox"/> | CC <input type="checkbox"/> <input type="checkbox"/> 1204 <input type="checkbox"/> <input type="checkbox"/> | CC <input type="checkbox"/> <input type="checkbox"/> 1204 <input type="checkbox"/> <input type="checkbox"/> | CC <input type="checkbox"/> <input type="checkbox"/> 1204 <input type="checkbox"/> <input type="checkbox"/> | CCGX1204 <input type="checkbox"/> <input type="checkbox"/>                                                       | CC <input type="checkbox"/> <input type="checkbox"/> 1204 <input type="checkbox"/> <input type="checkbox"/> |  |

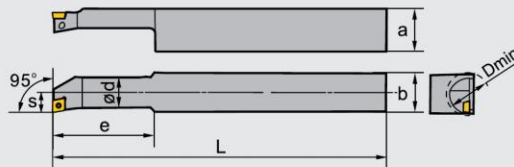
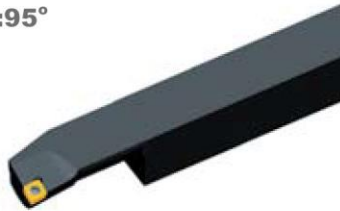
A

General turning

Internal turning tools

#### Corresponding tool holders of insert **CC** ☐ ☐ S-type clamping

#### SCLCR Kr:95°



| Type                   | Stock |   | Basic dimensions(mm) |    |     |    |    |    |    | Screw                                                                             | Wrench                                                                             |  |  |
|------------------------|-------|---|----------------------|----|-----|----|----|----|----|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--|--|
|                        | R     | L | Dmin                 | ød | L   | s  | a  | b  | e  |  |  |  |  |
| <b>S10M-SCLCR06S20</b> | ▲     | △ | 13                   | 10 | 150 | 7  | 22 | 20 | 30 | I60M2.5×5.5                                                                       | WT07IP                                                                             |  |  |
| <b>S12P-SCLCR06S20</b> | ▲     | △ | 16                   | 12 | 170 | 9  | 22 | 20 | 35 |                                                                                   |                                                                                    |  |  |
| <b>S16Q-SCLCR09S20</b> | ▲     | △ | 20                   | 16 | 180 | 11 | 22 | 20 | 40 | I60M3.5×8                                                                         | WT15IP                                                                             |  |  |
| <b>S20R-SCLCR09S20</b> | ▲     | △ | 25                   | 20 | 200 | 13 | 22 | 20 | 60 |                                                                                   |                                                                                    |  |  |

▲ Stock available

△ Make-to-order

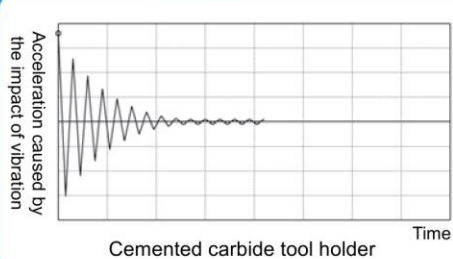
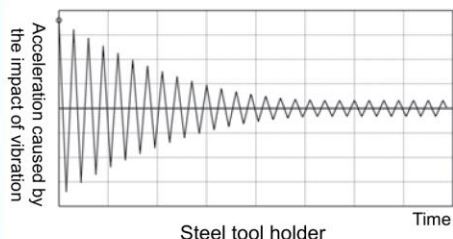
#### Applicable inserts

| Application      | For extra finishing                                                                               | For finishing                                                                                     | For semi-finishing                                                                                | For roughing                                                                                       | For Al machining                                                                                    | For cast iron machining                                                                                              |
|------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Inserts shape    | <b>SF</b>  A80 | <b>HF</b>  A80 | <b>HM</b>  A81 | <b>HR</b>  A82 | <b>LH</b>  A82 | <b>Without chipbreaker</b>  A83 |
|                  |                                                                                                   | <b>EF</b>  A81 | <b>EM</b>  A81 |                                                                                                    | <b>LC</b>  A82 |                                                                                                                      |
| Tool holder type | <input type="checkbox"/> <input type="checkbox"/> -SCLCR06S20                                     | CC <input type="checkbox"/> 0602 <input type="checkbox"/>                                         | CC <input type="checkbox"/> 0602 <input type="checkbox"/>                                         | CC <input type="checkbox"/> 0602 <input type="checkbox"/>                                          | CC <input type="checkbox"/> 0602 <input type="checkbox"/>                                           | CCGX0602 <input type="checkbox"/>                                                                                    |
|                  | <input type="checkbox"/> <input type="checkbox"/> -SCLCR09S20                                     | CC <input type="checkbox"/> 09T3 <input type="checkbox"/>                                         | CC <input type="checkbox"/> 09T3 <input type="checkbox"/>                                         | CC <input type="checkbox"/> 09T3 <input type="checkbox"/>                                          | CC <input type="checkbox"/> 09T3 <input type="checkbox"/>                                           | CCGX09T3 <input type="checkbox"/>                                                                                    |

# ***Damping tool holders for internal turning***

## **Technical features**

Increasing material rigidity of tool holder can reduce the amplitude, or obtain larger overhang under the condition of same systemic stability. Therefore, compared with steel tool holder, cemented carbide tool holder has better dampening effect, smaller amplitude and reaches convergence point sooner. As for machining under the condition of long overhang and easy vibration, they can exert excellent performance and achieve higher dimensional accuracy and surface quality.



Under the same machining condition  
the maximum overhang of  
cemented carbide tool holder  
can reach  $L \leq 6D$ , while the  
recommended maximum overhang  
of steel tool holder is  $L \leq 3D$ .



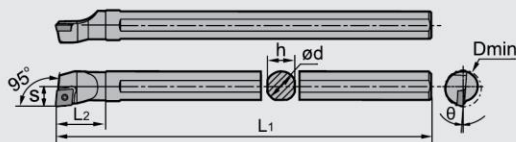
### Corresponding tool holders of insert **CP** (Damping tool holder) S-type clamping

#### SCLPR/L

Kr:95°



R-type shown



| Type           | Stock |   | Basic dimensions(mm) |    |    |     |    |    |     | Screw       | Wrench |  |  |
|----------------|-------|---|----------------------|----|----|-----|----|----|-----|-------------|--------|--|--|
|                | R     | L | Dmin                 | ød | s  | L1  | L2 | h  | θ   |             |        |  |  |
| C10M-SCLPR/L06 | ▲     | △ | 12                   | 10 | 6  | 150 | 17 | 9  | -7° | I60M2.5×5.5 | WT07IP |  |  |
| C12Q-SCLPR/L06 | △     | △ | 16                   | 12 | 8  | 180 | 20 | 11 | -4° |             |        |  |  |
| C16R-SCLPR/L09 | ▲     | △ | 20                   | 16 | 10 | 200 | 29 | 15 | -4° | I60M3.5×8   | WT15IP |  |  |
| C20S-SCLPR/L09 | △     | △ | 25                   | 20 | 13 | 250 | 35 | 18 | -4° |             |        |  |  |

▲ Stock available

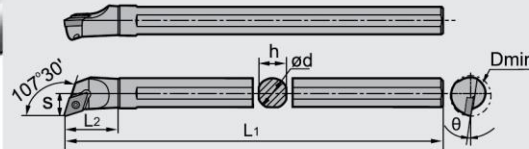
△ Make-to-order

#### Applicable inserts

| Application      | For extra finishing                                                                         |
|------------------|---------------------------------------------------------------------------------------------|
| Inserts shape    | SF  A100 |
| Tool holder type |                                                                                             |
| □□-SCLPR/L06     | CP□□0602□□                                                                                  |
| □□-SCLPR/L09     | CP□□09T3□□                                                                                  |

Corresponding tool holders of insert **DP** (Damping tool holder) S-type clamping**SDQPR/L**  
Kr:107°30'

R-type shown



| Type           | Stock |   | Basic dimensions(mm) |    |    |     |    |    |     | Screw                                                                             | Wrench                                                                             |  |  |
|----------------|-------|---|----------------------|----|----|-----|----|----|-----|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--|--|
|                | R     | L | Dmin                 | ød | s  | L1  | L2 | h  | θ   |  |  |  |  |
| C10M-SDQPR/L07 | ▲     | △ | 13                   | 10 | 7  | 150 | 20 | 9  | -8° | I60M2.5×5.5                                                                       | WT07IP                                                                             |  |  |
| C12Q-SDQPR/L07 | △     | △ | 16                   | 12 | 9  | 180 | 22 | 11 | -8° |                                                                                   |                                                                                    |  |  |
| C16R-SDQPR/L07 | △     | △ | 20                   | 16 | 11 | 200 | 27 | 15 | -6° |                                                                                   |                                                                                    |  |  |
| C16R-SDQPR/L11 | △     | △ | 20                   | 16 | 11 | 200 | 32 | 15 | -6° | I60M3.5×8                                                                         | WT15IP                                                                             |  |  |
| C20S-SDQPR/L11 | ▲     | △ | 25                   | 20 | 13 | 250 | 33 | 18 | -6° |                                                                                   |                                                                                    |  |  |

▲Stock available

△Make-to-order

## Applicable inserts

| Application      | For extra finishing                                                                         |
|------------------|---------------------------------------------------------------------------------------------|
| Inserts shape    | SF  A101 |
| Tool holder type |                                                                                             |
| □□-SDQPR/L07     | DP□□0702□□                                                                                  |
| □□-SDQPR/L11     | DP□□11T3□□                                                                                  |

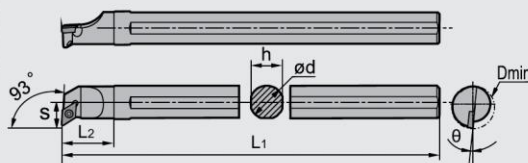
A

General  
turning

Internal Turning Tools(Damping Tool holder)

Corresponding tool holders of insert **DP** ☐ ☐ (Damping tool holder) S-type clamping**SDUPR/L**  
**Kr:93°**

R-type shown



| Type                  | Stock |   | Basic dimensions(mm) |    |    |     |    |    |     | Screw                                                                             | Wrench                                                                             |  |  |
|-----------------------|-------|---|----------------------|----|----|-----|----|----|-----|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--|--|
|                       | R     | L | Dmin                 | ød | s  | L1  | L2 | h  | θ   |  |  |  |  |
| <b>C10M-SDUPR/L07</b> | △     | △ | 15                   | 10 | 9  | 150 | 18 | 9  | -8° | I60M2.5×5.5<br><br>I60M2.5×6.5                                                    | WT071P                                                                             |  |  |
| <b>C12Q-SDUPR/L07</b> | △     | △ | 16                   | 12 | 9  | 180 | 19 | 11 | -8° |                                                                                   |                                                                                    |  |  |
| <b>C16R-SDUPR/L07</b> | △     | △ | 20                   | 16 | 11 | 200 | 25 | 15 | -6° |                                                                                   |                                                                                    |  |  |

▲Stock available

△Make-to-order

## Applicable inserts

Application

For extra finishing

Inserts shape

**SF**

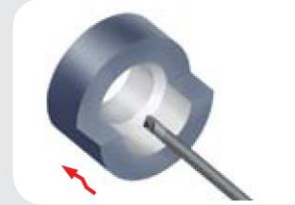
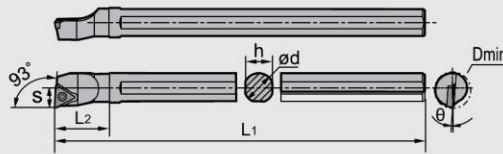
A101

Tool holder type

☐ **SDQPR/L07**DP☐☐0702☐☐

Corresponding tool holders of insert **TP** (Damping tool holder) S-type clamping**STUPR/L**  
Kr:93°

R-type shown



| Type                  | Stock |   | Basic dimensions(mm) |    |    |     |    |    |     | Screw                                                                             | Wrench                                                                             |  |  |
|-----------------------|-------|---|----------------------|----|----|-----|----|----|-----|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--|--|
|                       | R     | L | Dmin                 | ød | s  | L1  | L2 | h  | θ   |  |  |  |  |
| <b>C10M-STUPR/L09</b> | ▲     | △ | 12                   | 10 | 6  | 150 | 20 | 9  | -6° | I60M2.2×5.5                                                                       | WT07IP                                                                             |  |  |
| <b>C12Q-STUPR/L09</b> | ▲     | △ | 16                   | 12 | 8  | 180 | 22 | 11 | -4° |                                                                                   |                                                                                    |  |  |
| <b>C12Q-STUPR/L11</b> | ▲     | △ | 16                   | 12 | 8  | 180 | 25 | 11 | -4° | I60M2.5×6.5                                                                       | WT07IP                                                                             |  |  |
| <b>C16R-STUPR/L11</b> | ▲     | △ | 20                   | 16 | 10 | 250 | 27 | 15 | -3° |                                                                                   |                                                                                    |  |  |

▲ Stock available

△ Make-to-order

## Applicable inserts

| Application      | For extra finishing |                                                                                     |
|------------------|---------------------|-------------------------------------------------------------------------------------|
| Inserts shape    | <b>SF</b>           |  |
|                  |                     | A104                                                                                |
| Tool holder type | □□-STUPR/L09        | TP□□0902□□                                                                          |
|                  | □□-STUPR/L11        | TP□□1103□□                                                                          |

**A**General  
turning

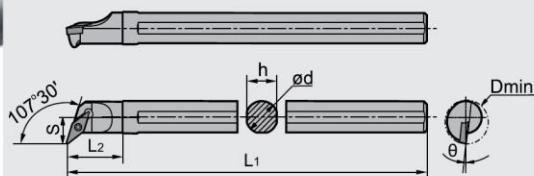
Internal Turning Tools(Damping Tool holder)

### Corresponding tool holders of insert **VC** (Damping tool holder) S-type clamping

#### SVQCR/L Kr:107°30'



R-type shown



| Type           | Stock |   | Basic dimensions(mm) |    |    |     |    |    |     | Screw       | Wrench |  |  |
|----------------|-------|---|----------------------|----|----|-----|----|----|-----|-------------|--------|--|--|
|                | R     | L | Dmin                 | ød | s  | L1  | L2 | h  | θ   |             |        |  |  |
| C16R-SVQCR/L11 | △     | △ | 22                   | 16 | 13 | 200 | 28 | 15 | -6° | I60M2.5×6.5 | WT07IP |  |  |
| C20S-SVQCR/L11 | △     | △ | 26                   | 20 | 15 | 250 | 32 | 18 | -4° |             |        |  |  |

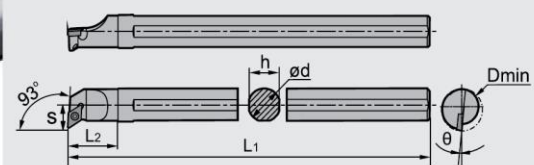
▲Stock available    △Make-to-order

### Corresponding tool holders of insert **VC** (Damping tool holder) S-type clamping

#### SVUCR/L Kr:93°



R-type shown



| Type           | Stock |   | Basic dimensions(mm) |    |    |     |    |    |     | Screw       | Wrench |  |  |
|----------------|-------|---|----------------------|----|----|-----|----|----|-----|-------------|--------|--|--|
|                | R     | L | Dmin                 | ød | s  | L1  | L2 | h  | θ   |             |        |  |  |
| C16R-SVUCR/L11 | △     | △ | 24                   | 16 | 15 | 200 | 25 | 15 | -6° | I60M2.5×6.5 | WT07IP |  |  |
| C20S-SVUCR/L11 | △     | △ | 28                   | 20 | 17 | 250 | 30 | 18 | -4° |             |        |  |  |

▲Stock available    △Make-to-order

#### Applicable inserts

| Application      |              | For extra finishing                                                                                   | For finishing                                                                                         | For AI machining                                                                                       |
|------------------|--------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Inserts shape    |              | SF  <div>A95</div> | HF  <div>A98</div> | LH  <div>A96</div> |
| Tool holder type | □□-SVQCR/L11 | VC□□1103□□                                                                                            | VC□□1103□□                                                                                            | VCGX1103□□                                                                                             |
|                  | □□-SVUCR/L11 | VC□□1103□□                                                                                            | VC□□1103□□                                                                                            | VCGX1103□□                                                                                             |
|                  |              |                                                                                                       |                                                                                                       |                                                                                                        |

Table of recommended cutting parameters for general turning

| ISO | Materials        |            | Hardness HB | CVD Coating           |         |         |         |         | PVD Coating |         |          | Cermet   | Coated cermet | Cemented carbide |         | Ceramic |         |
|-----|------------------|------------|-------------|-----------------------|---------|---------|---------|---------|-------------|---------|----------|----------|---------------|------------------|---------|---------|---------|
|     |                  |            |             | YBC151                | YBC251  | YBC152  | YBC252  | YBC351  | YBG102      | YBG202  | YBG302   | YNG151   | YNG151C       | YC10             | YC40    | CA1000  | CN2000  |
|     |                  |            |             | Feed rate (mm/rev)    |         |         |         |         |             |         |          |          |               |                  |         |         |         |
|     |                  |            |             | 0.1-0.6               | 0.1-0.8 | 0.1-0.6 | 0.1-0.8 | 0.2-1.0 | 0.2-0.4     | 0.1-0.6 | 0.05-0.8 | 0.05-0.2 | 0.05-0.2      | 0.1-0.4          | 0.1-0.5 | 0.1-1.5 | 0.1-1.5 |
|     |                  |            |             | Cutting speed (m/min) |         |         |         |         |             |         |          |          |               |                  |         |         |         |
| P   | Carbon steel     | C=0.15%    | 125         | 430-200               | 430-190 | 500-270 | 480-240 | 380-165 | 460-220     | 380-180 | 360-165  | 550-350  | 580-350       | 360-165          | 300-145 | 800-300 |         |
|     |                  | C=0.35%    | 150         | 380-180               | 410-180 | 460-250 | 460-230 | 300-150 | 440-210     | 300-170 | 280-150  | 500-300  | 520-300       | 280-150          | 220-130 | 600-200 |         |
|     |                  | C=0.60%    | 200         | 330-150               | 350-150 | 400-220 | 400-200 | 260-130 | 380-180     | 260-150 | 240-130  | 460-260  | 480-260       | 240-130          | 180-80  | 400-150 |         |
|     | Alloy steel      | Anneal     | 180         | 350-170               | 350-150 | 400-180 | 400-200 | 200-100 | 380-180     | 200-120 | 180-100  | 410-240  | 430-240       | 180-100          | 160-80  | 150-180 | 400-150 |
|     |                  | Hardened   | 275         | 230-100               | 210-100 | 280-150 | 260-140 | 140-70  | 240-120     | 140-90  | 120-70   | 300-180  | 320-180       | 120-70           | 120-50  | 350-120 | 300-100 |
|     |                  | Hardened   | 300         | 210-100               | 190-70  | 260-150 | 240-120 | 125-60  | 220-100     | 125-80  | 100-60   | 250-170  | 270-170       | 100-60           | 80-40   | 300-100 | 250-80  |
|     |                  | Hardened   | 350         | 180-80                | 170-70  | 230-120 | 220-120 | 110-55  | 200-100     | 110-75  | 90-55    | 230-150  | 250-150       | 90-55            | 70-45   | 300-80  |         |
|     | High alloy steel | Anneal     | 200         | 320-150               | 260-120 | 360-190 | 310-170 | 175-80  | 290-150     | 175-100 | 155-80   | 350-200  | 370-200       | 155-80           | 135-60  | 400-150 | 350-120 |
|     |                  | Hardene    | 325         | 140-90                | 100-50  | 190-130 | 150-100 | 85-40   | 130-80      | 85-60   | 65-40    | 170-110  | 190-110       | 65-40            | 45-30   | 300-100 | 280-80  |
|     | Cast steel       | Non-Alloy  | 180         | 240-120               | 200-100 | 280-160 | 250-140 | 135-75  | 230-125     | 135-95  | 115-75   | 260-170  | 280-170       | 115-75           | 95-55   | 600-220 |         |
|     |                  | Low alloy  | 200         | 230-70                | 170-60  | 280-110 | 220-110 | 120-80  | 200-90      | 120-100 | 100-80   | 260-170  | 280-170       | 100-80           | 80-60   | 400-150 |         |
|     |                  | High alloy | 225         | 160-70                | 140-50  | 210-110 | 190-100 | 95-55   | 170-80      | 95-55   | 95-55    | 260-100  | 280-100       | 95-55            | 75-35   | 350-120 |         |
| ISO | Materials        |            | Hardness HB | CVD Coating           |         |         |         |         | PVD Coating |         |          | Cermet   | Coated cermet |                  |         |         |         |
|     |                  |            |             | YBM151                | YBM251  | YBM253  |         |         | YBG202      | YBG205  | YBG302   | YNG151   | YNG151C       |                  |         |         |         |
|     |                  |            |             | Feed rate (mm/rev)    |         |         |         |         |             |         |          |          |               |                  |         |         |         |
|     |                  |            |             | 0.2-0.6               | 0.2-0.6 | 0.2-0.6 |         |         | 0.1-0.4     | 0.2-0.4 | 0.2-0.6  | 0.1-0.3  | 0.1-0.3       |                  |         |         |         |
|     |                  |            |             | Cutting speed (m/min) |         |         |         |         |             |         |          |          |               |                  |         |         |         |
| M   | Stainless steel  | Ferrite    | 180         | 280-180               | 250-140 | 260-140 |         |         | 300-190     | 290-190 | 250-150  | 330-220  | 350-210       |                  |         |         |         |
|     |                  | Austenite  | 260         | 250-150               | 200-110 | 210-110 |         |         | 250-160     | 240-160 | 220-120  | 250-150  | 270-140       |                  |         |         |         |
|     |                  | Martensite | 330         | 200-140               | 210-130 | 220-130 |         |         | 260-170     | 250-170 | 210-120  | 270-170  | 290-160       |                  |         |         |         |

## Recommended table of cutting parameters for general turning

| ISO | Materials           |                                                | Hardness HB | CVD Coating           |         |                  |          |          | Cermet   | Coated cermet | Ceramic  |         |         | Cemented carbide |         |
|-----|---------------------|------------------------------------------------|-------------|-----------------------|---------|------------------|----------|----------|----------|---------------|----------|---------|---------|------------------|---------|
|     |                     |                                                |             | YBD052                | YBD151  | YBD102           | YBD152   | YBD252   | YNG151   | YNG151C       | CA1000   | CN1000  | CN2000  | YC10             | YC40    |
|     |                     |                                                |             | Feed rate (mm/rev)    |         |                  |          |          |          |               |          |         |         |                  |         |
|     |                     |                                                |             | 0.1-0.4               | 0.1-0.6 | 0.1-0.4          | 0.1-0.5  | 0.1-0.8  | 0.1-0.4  | 0.1-0.4       | 0.1-1.5  | 0.1-1.5 | 0.1-1.5 | 0.1-0.3          | 0.1-0.4 |
|     |                     |                                                |             | Cutting speed (m/min) |         |                  |          |          |          |               |          |         |         |                  |         |
| K   | Malleable cast iron | Ferrite                                        | 130         | 350-230               | 315-210 | 330-220          | 320-105  | 250-170  | 280-160  | 300-180       | 1200-200 | 800-600 | 800-600 | 150-90           | 105-45  |
|     |                     | Pearlite                                       | 230         | 250-105               | 225-95  | 230-100          | 230-100  | 180-75   | 220-120  | 240-150       | 1000-200 | 700-500 | 700-500 | 120-70           | 80-30   |
|     | Low cast iron       |                                                | 180         | 520-200               | 450-180 | 480-200          | 480-190  | 380-150  | 400-250  | 420-270       | 1200-200 | 800-600 | 700-500 | 170-100          | 130-60  |
|     | High cast iron      |                                                | 260         | 230-120               | 210-110 | 220-115          | 210-100  | 170-90   | 360-240  | 380-260       | 1000-200 | 750-500 | 800-600 | 130-70           | 95-40   |
|     | Nodular cast iron   | Ferrite                                        | 160         | 310-150               | 285-140 | 300-150          | 290-140  | 220-110  | 330-190  | 350-210       | 800-200  | 600-450 | 600-450 | 140-80           | 115-45  |
|     |                     | Pearlite                                       | 250         | 230-110               | 210-100 | 220-105          | 210-100  | 170-90   | 310-200  | 330-220       | 700-200  | 500-350 | 500-350 | 110-70           | 80-30   |
| ISO | Materials           |                                                | Hardness HB | PVD Coating           |         | Cemented carbide | CBN      |          | PCD      |               |          |         |         |                  |         |
|     |                     |                                                |             | YBG102                |         | YD101            | YCB011   | YCB012   | YCD011   |               |          |         |         |                  |         |
|     |                     |                                                |             | Feed rate (mm/rev)    |         |                  |          |          |          |               |          |         |         |                  |         |
|     |                     |                                                |             | 0.05-0.15             |         | 0.05-0.35        | 0.05-0.5 | 0.05-0.2 | 0.05-0.5 |               |          |         |         |                  |         |
|     |                     |                                                |             | Cutting speed (m/min) |         |                  |          |          |          |               |          |         |         |                  |         |
| N   | Al alloy            | No heat treatment                              | 60          |                       |         | 1750-800         |          |          | <2500    |               |          |         |         |                  |         |
|     |                     | Heat treatment                                 | 100         |                       |         | 510-250          |          |          | <2500    |               |          |         |         |                  |         |
|     | Cast aluminum alloy | No heat treatment                              | 75          |                       |         | 460-175          |          |          | <2500    |               |          |         |         |                  |         |
|     |                     | Heat treatment                                 | 90          |                       |         | 300-110          |          |          | <2500    |               |          |         |         |                  |         |
|     | Copper alloy        | Lead alloy                                     | 110         |                       |         | 610-205          |          |          | 630-65   |               |          |         |         |                  |         |
|     |                     | Copper, pure copper                            | 90          |                       |         | 310-195          |          |          | 630-65   |               |          |         |         |                  |         |
|     |                     | Copper, nonlead<br>Copper, electrolytic copper | 100         |                       |         | 225-115          |          |          | 375-30   |               |          |         |         |                  |         |
| S   | Ni-base alloy       | Ni-base alloy                                  | 40          | 90-30                 |         | 70-20            |          |          |          |               |          |         |         |                  |         |
| H   | Other materials     | Hard steel                                     | 45 HRC      |                       |         |                  |          | 350-225  |          |               |          |         |         |                  |         |
|     |                     | Super hard steel                               | 50~60 HRC   |                       |         |                  |          | 250-135  |          |               |          |         |         |                  |         |
|     |                     | Chilled cast iron                              | 500         |                       |         |                  | 180-120  |          |          |               |          |         |         |                  |         |

## Table of correctional cutting parameters of internal turning

Internal turning tools by P-type clamping

| Workpiece material                                | Hardness HB | Machining category | L/D≤3                 |                       | L/D=3-4<br>(Diameter of shank ≥ Φ 16mm) |                       |
|---------------------------------------------------|-------------|--------------------|-----------------------|-----------------------|-----------------------------------------|-----------------------|
|                                                   |             |                    | Feed rate<br>(mm/rev) | Cutting depth<br>(mm) | Feed rate<br>(mm/rev)                   | Cutting depth<br>(mm) |
| <b>P</b> Carbon steel, Alloy steel<br>45#, 42CrMo | HB180—280   | For semi-finishing | 0.1- <b>0.25</b> -0.4 | <5.0                  | 0.1- <b>0.2</b> -0.3                    | <4.0                  |
| <b>M</b> Stainless steel<br>1Cr18Ni9Ti 0Cr18Ni9   | ≤HB220      | For semi-finishing | 0.1- <b>0.2</b> -0.3  | <4.0                  | 0.1- <b>0.15</b> -0.25                  | <3.0                  |
| <b>K</b> Cast iron HT250                          | HB170—230   | For semi-finishing | 0.1- <b>0.25</b> -0.4 | <5.0                  | 0.1- <b>0.2</b> -0.3                    | <4.0                  |

Internal turning tools by S-type clamping

| Workpiece material                                   | Hardness HB | Machining category | L/D≤3                   |                       | L/D=4                  |                       | L/D=5                  |                       | L/D=6                  |                       |
|------------------------------------------------------|-------------|--------------------|-------------------------|-----------------------|------------------------|-----------------------|------------------------|-----------------------|------------------------|-----------------------|
|                                                      |             |                    | Feed rate<br>(mm/rev)   | Cutting depth<br>(mm) | Feed rate<br>(mm/rev)  | Cutting depth<br>(mm) | Feed rate<br>(mm/rev)  | Cutting depth<br>(mm) | Feed rate<br>(mm/rev)  | Cutting depth<br>(mm) |
| <b>P</b> Carbon steel,<br>Alloy steel<br>45#, 42CrMo | HB180-280   | For finishing      | 0.05- <b>0.1</b> -0.15  | <0.2                  | 0.05- <b>0.1</b> -0.15 | <0.2                  |                        |                       |                        |                       |
|                                                      |             | For semi-finishing | 0.15- <b>0.25</b> -0.35 | <3.0                  | 0.1- <b>0.15</b> -0.2  | <1.5                  |                        |                       |                        |                       |
| <b>M</b> Stainless steel<br>1Cr18Ni9Ti<br>0Cr18Ni9   | ≤HB220      | For finishing      | 0.05- <b>0.1</b> -0.15  | <0.2                  | 0.05- <b>0.1</b> -0.15 | <0.2                  |                        |                       |                        |                       |
|                                                      |             | For semi-finishing | 0.15- <b>0.2</b> -0.25  | <2.0                  | 0.1- <b>0.15</b> -0.2  | <1.0                  |                        |                       |                        |                       |
| <b>N</b> Al Alloy                                    | ---         | For finishing      | 0.05- <b>0.1</b> -0.15  | <0.2                  | 0.05- <b>0.1</b> -0.15 | <0.2                  | 0.05- <b>0.1</b> -0.15 | -0.15                 | 0.05- <b>0.1</b> -0.15 | <0.1                  |
|                                                      |             | For semi-finishing | 0.05- <b>0.1</b> -0.15  | <2.0                  | 0.05- <b>0.1</b> -0.15 | <1.5                  | 0.05- <b>0.1</b> -0.15 | -1.0                  | 0.05- <b>0.1</b> -0.15 | <1.0                  |

Damping internal turning tools

| Workpiece material              | Machining conditions | Chipbreaker | Inserts material  | Feed rate<br>(mm/rev)  | Cutting depth<br>(mm)     |
|---------------------------------|----------------------|-------------|-------------------|------------------------|---------------------------|
| <b>P</b> Steel HB180—280        | For finishing        | SF          | YNG151<br>YNG151C | 0.05- <b>0.2</b> -0.35 | 0.05- <b>0.1-0.3</b> -0.5 |
| <b>M</b> Stainless steel ≤HB220 |                      |             |                   | 0.05- <b>0.2</b> -0.35 | 0.05- <b>0.1-0.3</b> -0.5 |
| <b>K</b> Cast iron HB170—230    |                      |             |                   | 0.05- <b>0.2</b> -0.35 | 0.05- <b>0.1-0.3</b> -0.5 |

Blue words are recommended cutting parameters.

### Frequent problems of turning and solutions

| Common problem                  | Cause                                       | Tool material                                                                      |                   | Cutting conditions |           |               |                | Tool shape                    |           |             |                |                       |                               |                                  | Machine clamping system               |                         |            |
|---------------------------------|---------------------------------------------|------------------------------------------------------------------------------------|-------------------|--------------------|-----------|---------------|----------------|-------------------------------|-----------|-------------|----------------|-----------------------|-------------------------------|----------------------------------|---------------------------------------|-------------------------|------------|
|                                 |                                             | Harder materials                                                                   | Tougher materials | Cutting speed      | Feed rate | Cutting depth | Cutting liquid | Change chipbreaker of inserts | Rake face | Nose radius | Approach angle | Cutting edge strength | Increase precision of inserts | Increase rigidity of tool holder | Clamping of tool holder and workpiece | Overhang of tool holder | Power, gap |
| Over abrasion on nose           | Bad precision during machining              | Abrasion intensified on flank                                                      | ✓                 |                    |           |               |                |                               |           | ↑           |                |                       |                               |                                  |                                       |                         |            |
|                                 |                                             | Unsuitable cutting conditions                                                      |                   | ↓                  | ↑         |               |                |                               |           |             |                |                       |                               |                                  |                                       |                         |            |
| Surface precision deterioration | Bad surface quality                         | Abrasion intensified and cutting edge not sharp enough                             | ✓                 | ↓                  |           |               | ✓              |                               | ↑         | ↑           |                | ↓                     | ✓                             |                                  |                                       |                         |            |
|                                 |                                             | Cutting edge breakage                                                              | ✓                 | ↓                  | ↓         |               | ✓              |                               | ↑         |             | ↑              |                       |                               |                                  | ✓                                     | ✓                       | ✓          |
|                                 |                                             | Unsuitable geometrical shape of cutting edge                                       |                   |                    |           |               | ✓              |                               | ↑         |             | ↓              | ✓                     |                               |                                  |                                       |                         |            |
|                                 |                                             | Unsuitable cutting conditions                                                      |                   | ↑                  | ↓         | ↓             | ✓              |                               |           |             |                |                       |                               |                                  |                                       |                         |            |
|                                 |                                             | Shake and vibration                                                                | ✓                 | ↓                  | ↓         | ↓             | ✓              | ✓                             | ↑         | ↓           | ↑              | ↓                     |                               | ✓                                | ✓                                     | ✓                       | ✓          |
|                                 |                                             | Built-up edge                                                                      |                   | ↑                  | ↑         |               | ✓              | ✓                             | ↑         |             |                | ↓                     | ✓                             |                                  |                                       |                         |            |
| Radiation of cutting heat       | Effect of cutting heat                      | Unsuitable cutting conditions                                                      |                   | ↓                  | ↓         | ↓             |                |                               |           |             |                |                       |                               |                                  |                                       |                         |            |
|                                 |                                             | Unsuitable geometrical shape of cutting edge                                       | ✓                 |                    |           |               |                | ✓                             | ↑         |             |                | ↓                     |                               |                                  |                                       |                         |            |
| Bad precision of dimensions     | Dimensions fluctuate during cutting         | Unsuitable inserts precision                                                       |                   |                    |           |               |                |                               |           |             |                |                       | ✓                             |                                  |                                       |                         |            |
|                                 |                                             | Offset of workpiece or tools                                                       |                   |                    |           |               |                | ✓                             | ↑         | ↓           | ↑              |                       |                               | ✓                                | ✓                                     | ✓                       | ✓          |
| Breakage                        | Abrasion intensified on flank and rake face | Abrasion on clearance face                                                         | ✓                 | ↓                  |           |               |                | ✓                             | ↑         | ↑           |                | ↓                     |                               |                                  |                                       |                         |            |
|                                 |                                             | Abrasion on rake face                                                              | ✓                 | ↓                  | ↓         | ↓             |                | ✓                             | ↑         |             | ↓              |                       |                               |                                  |                                       |                         |            |
|                                 | Light breakage                              | Shake and impact                                                                   | ✓                 | ↓                  | ↓         |               | ✓              |                               |           |             | ↓              | ↑                     |                               | ✓                                | ✓                                     | ✓                       | ✓          |
|                                 | Built-up edge                               | Unsuitable workpiece hardness for cutting conditions                               |                   | ↑                  | ↑         |               | ✓              | ✓                             | ↑         |             |                | ↓                     | ✓                             |                                  |                                       |                         |            |
|                                 |                                             | Hardness of workpiece material and tool material unsuitable for cutting conditions |                   | ↓                  | ↓         | ↓             | ✓              | ✓                             | ↑         |             |                | ↓                     |                               |                                  |                                       |                         |            |
|                                 | Cutting edge nose deformation               | Occurring during intermittent machining with high feed rate                        | ✓                 | ↑                  | ↓         | ↓             | ✓              | ✓                             | ↑         | ↑           | ↓              | ↓                     |                               |                                  |                                       |                         |            |
|                                 | Tool life                                   | Unsuitable materials and cutting conditions                                        | ✓                 | ↓                  | ↓         |               | ✓              |                               |           | ↑           | ↓              | ↑                     |                               | ✓                                | ✓                                     | ✓                       | ✓          |
| Chip controlling                | Intertwist of long chips                    | Unsuitable cutting condition                                                       |                   | ↓                  | ↑         | ↑             | ✓              |                               |           |             |                |                       |                               |                                  |                                       |                         |            |
|                                 |                                             | Unsuitable geometry                                                                |                   |                    |           |               | ✓              |                               |           | ↓           | ↑              |                       |                               |                                  |                                       |                         |            |
|                                 | Too short chips lead to splash              | Unsuitable cutting condition                                                       |                   | ↓                  | ↓         | ✓             |                |                               |           |             |                |                       |                               |                                  |                                       |                         |            |
|                                 |                                             | Unsuitable geometrical shape of cutting edge                                       |                   |                    |           |               | ✓              |                               | ↑         | ↓           |                |                       |                               |                                  |                                       |                         |            |
| Burr and knockdown flange       | Steel and Al, burrs occurring               | Unsuitable cutting condition                                                       |                   | ↑                  | ↓         | ✓             |                |                               |           |             |                |                       |                               |                                  |                                       |                         |            |
|                                 |                                             | Tool abrasion and unsuitable geometrical shape                                     | ✓                 |                    |           |               | ✓              | ↑                             | ↓         | ↑           | ↓              |                       |                               |                                  |                                       |                         |            |
|                                 | Cast iron, knockdown flange                 | Unsuitable cutting conditions                                                      |                   | ↓                  | ↑         | ✓             |                |                               |           |             |                |                       |                               |                                  |                                       |                         |            |
|                                 |                                             | Tool abrasion and unsuitable geometrical shape                                     | ✓                 |                    |           |               | ✓              | ✓                             | ↓         | ↓           | ↓              |                       |                               |                                  |                                       |                         |            |
|                                 | Soft steel, raw edges                       | Unsuitable cutting condition                                                       |                   | ↓                  | ↓         |               |                |                               |           |             |                |                       |                               |                                  |                                       |                         |            |
|                                 |                                             | Tool abrasion and unsuitable geometrical shape                                     | ✓                 |                    |           |               | ✓              | ↑                             | ↑         |             | ↑              |                       |                               | ✓                                | ✓                                     | ✓                       | ✓          |

## Abrasion of tools and various damages

| Tool damage type                                   | Phenomenon                                                                                 | Cause                                                                                                                                          | Solution                                                                                                                                                                                                                                         |
|----------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Flank wear</b>                                  | Cutting resistant force increasing<br>Groove wear on flank                                 | Tool material is too soft.<br>Cutting speed is too high.<br>Clearance angle is too small.<br>Feed rate is too low.                             | <ul style="list-style-type: none"> <li>◆ Select tool materials with good wear resistance.</li> <li>◆ Reduce cutting speed.</li> <li>◆ Enlarge clearance angle.</li> <li>◆ Increase feed rate.</li> </ul>                                         |
| <b>Rake face wear (Crater wear)</b>                | Bad chip controlling<br>Surface quality deterioration                                      | Tool material is too soft.<br>Cutting speed is too high.<br>Feed rate is too high.                                                             | <ul style="list-style-type: none"> <li>◆ Select tool materials with good wear resistance.</li> <li>◆ Reduce cutting speed.</li> <li>◆ Reduce feed rate.</li> </ul>                                                                               |
| <b>Cutting edge breakage</b>                       | Occasional breakage<br>Instability of tool life                                            | Tool material is too hard.<br>Feed rate is high.<br>Cutting intensity is not high enough.<br>Rigidity of tool holder and tool bar is small.    | <ul style="list-style-type: none"> <li>◆ Select tool materials with good toughness.</li> <li>◆ Reduce feed rate.</li> <li>◆ Increase land width (if rounding changes into chamfering).</li> <li>◆ Enlarge tool bar size</li> </ul>               |
| <b>Breakage</b>                                    | Cutting resistant force increasing<br>Deterioration of surface roughness                   | Tool material is too hard.<br>Feed rate is high.<br>Cutting edge strength is not high enough.<br>Rigidity of tool holder and tool bar is low.  | <ul style="list-style-type: none"> <li>◆ Select tool materials with good toughness.</li> <li>◆ Reduce feed rate.</li> <li>◆ Increase land width (if rounding changes into chamfering).</li> <li>◆ Enlarge tool bar size.</li> </ul>              |
| <b>Plastic deformation (Cutting edge collapse)</b> | Workpiece dimensions change<br>Nose abrasion                                               | Tool material is too soft.<br>Cutting speed is too high.<br>Cutting depth and feed rate are too high.<br>Cutting edge temperature is too high. | <ul style="list-style-type: none"> <li>◆ Select tool material with good wear resistance</li> <li>◆ Reduce cutting speed.</li> <li>◆ Reduce cutting depth and feed rate.</li> <li>◆ Select tool materials with good heat conductivity.</li> </ul> |
| <b>Built-up edge (Bonding)</b>                     | Surface quality deterioration during finishing<br>Cutting resistant force increasing       | Cutting speed is low.<br>Cutting edge is not sharp enough.<br>Tool material is unsuitable.                                                     | <ul style="list-style-type: none"> <li>◆ Increase cutting speed.</li> <li>◆ Enlarge rake angle.</li> <li>◆ Select tool materials that are not easy to adhere together (coating, cermet, etc.)</li> </ul>                                         |
| <b>Thermal cracking</b>                            | Damage because of thermal circulation<br>Normally occurring during intermittent machining  | Dilation and constriction are caused by cutting heat.<br>Tool material is too hard.                                                            | <ul style="list-style-type: none"> <li>◆ Adopt dry cutting.</li> <li>◆ Select tool materials with good toughness.</li> </ul>                                                                                                                     |
| <b>Frittering</b>                                  | burrs occurring<br>Cutting resistant force increasing                                      | Feed rate and cutting speed are too high.                                                                                                      | <ul style="list-style-type: none"> <li>◆ Select tool materials with good wear resistance.</li> <li>◆ Sharpen cutting edge by enlarging rake angle.</li> <li>◆ Reduce cutting speed.</li> </ul>                                                   |
| <b>Flaking off</b>                                 | Usually occurring when machining super hard materials, which is accompanied with vibration | Bonding occurs on cutting edge.<br>Chip flow is obstructed.                                                                                    | <ul style="list-style-type: none"> <li>◆ Sharpen cutting edge by enlarging rake angle.</li> <li>◆ Enlarge chip pocket.</li> </ul>                                                                                                                |