High-Performance Cut-Off Solutions

KPK Series

NEW

Unique Design for Superior Performance in Cut-Off Operations

Easy Insert Replacement
Strong Clamping Mechanism for Added Safety and Security
Long Tool Life and Stable Machining with Unique Chipbreaker Designs
Jet Coolant-Through Styles Available (JCT)
High-Performance Cut-Off Solutions

KPK Series

Easy Insert Replacement Reduces Downtime
High Performance, Long Tool Life and Stable Machining with Strong Clamping Mechanism

CUT-OFF SOLUTION

During cut-off operations, insert cutting widths of only a few millimeters are used to cut to the center of the workpiece.

Cut-off is often used on bottlenecks of a workpiece or during the final process, requiring a trouble-free machining environment.

<table>
<thead>
<tr>
<th>Challenges</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>The shape of the workpiece can be difficult to secure, thus creating rigidity and chattering issues.</td>
<td>The KPK Series features new insert, blade, and tool block designs for rigid, safe, and secure cut-off operations.</td>
</tr>
</tbody>
</table>

Firm Clamping Power

High-Rigidity Tool Holder Block

Long tool life with internal coolant
Excellent chip evacuation

Great for High Pressure Coolant

JCT Series

Durable Performance
Newly Developed Blade Design

Advanced Chipbreaker Technology
High-Performance Insert
1 Easy Insert Replacement

Reduce down time with fast insert replacement
Turn wrench slightly to release insert
No hammer or screw required
Self-clamping

2 Firm Insert Clamp Ensures Added Safety and Security

The firmly secured insert uses three contact surfaces to eliminate sliding or chattering

1. Top Clamp
   Holds the insert in place

2. Back Stop
   Prevents insert retraction and makes mounting inserts easier

3. V-Shaped Insert Seat
   Optimized insert seating prevents insert movement

Insert Deviation Comparison (Internal evaluation)

Cutting Performance Comparison (Internal evaluation)

Cutting Conditions: \( n = 320 \text{ min}^{-1} \) (constant), \( V_c = \sim 100 \text{ m/min} \), \( f = 0.12 \text{ mm/rev} \), Wet (External coolant) Workpiece: SCM 435 (ø 100) Edge width: 3 mm (PM Chipbreaker)
Unique Chipbreaker for Long Tool Life and Stable Machining

Advanced chipbreaker technology inherited from KGD lineup provides excellent chip control

For Tough edge and High-feed machining

General use

**PM Chipbreaker**

Insert grade

For Steel : PR1625
For Stainless steel : PR1535
For Cast Iron and Aluminum : GW15

**PH Chipbreaker**

**Wear Resistance Comparison** (Internal Evaluation)

Cutting Conditions: $n = 955 \text{ min}^{-1}$ (Constant), $V_c = 150 \text{ m/min}$, $f = 0.12 \text{ mm/rev}$ ($t = 10$. $f = 0.05 \text{ mm/rev}$). Wet (External Coolant)
Workpiece: SCM 415 (ø 50) Edge width: 3 mm (PM Chipbreaker)

**Chip Control Comparison** (Internal Evaluation)

Cutting Conditions: $n = 780 \text{ min}^{-1}$ (Constant), $V_c = 120 \text{ m/min}$, Wet (External Coolant)
Workpiece: SCM 415 (ø 50) Blade width: 3 mm (PM Chipbreaker)

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**SOLUTION 1** Tool Life x 1.3

**Stable chip curl**

**Rings (SUJ2)**

External Coolant

KPK 34 pcs/corner

Competitor D 25 pcs/corner

Cutting Conditions: $n = 90 \text{ min}^{-1}$ (Constant), $V_c = 140 \text{ m/min}$, $f = 0.06 \text{ mm/rev}$, Wet (External Coolant) KPKB32-3 PKM30N-025PM PR1625 (User evaluation)

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**SOLUTION 2** Machining efficiency double in Stainless steel

**Achievement of stable machining**

**Adaptor (SU316)**

External Coolant

KPK

Competitor E

Cutting Conditions: $n = 1,450 \text{ min}^{-1}$ (Constant), $V_c = 173 \text{ m/min}$, $f = 0.05 \text{ mm/rev}$ (Inching: 1 mm) Wet (External coolant) KPKB32-3 PKM30N-025PM PR1535 (User evaluation)
4 Rigid Tool Holder Block Prevents Chattering and Provides Internal Coolant

**KPKTB-JCT**
- Original three-way clamp for securing blades
- Internal coolant available
- Maximum coolant pressure: 7 MPa
- High-rigidity bottom jaw

**Chatter Resistance Comparison (Internal evaluation)**
Comparison of areas where stable machining is possible by changing the overhang amount of blade by 1 mm.

**Blade overhang amount**
- KPK
- Competitor C

**Internal Coolant - 0.5 MPa (KPK)**

**External Coolant - 0.5 MPa (KPK)**

**Note**
**KTKTB type is compatible** with internal coolant with an optional internal connector. (~ 1 MPa)
*(Refer to page 9 for the supply method (Type C))*

**JCT series supports internal coolant. Improved tool life under normal pressure**

**CG Image**

**KPKB-JCT maximum overhang length while using internal coolant is as follows:**
- Size 26: 40 mm
- Size 32: 59 mm

**SOLUTION**
- **Double tool life**
- **Reduce fracturing**

**Machine part (SUS304)**
- **Internal Coolant**

**KPK**
- **60 pcs/corner (Stable)**

**Competitor F**
- **30 pcs/corner (Unstable)**

**Wear Resistance Comparison (Internal evaluation)**

**Coolant is supplied directly to the rake and the flank face of the cutting edge for increased tool life and improved chip control**

**Chip Control Comparison (Internal evaluation)**

**Cutting Conditions**:
- **KPK**: Vc = 65 m/min (Constant), f = 0.06 mm/rev,
  Wet (Internal coolant 3.5MPa)  PKPK82-JCT  PMX30N·G2PM  PR1535
- **Competitor F**: Vc = 780 m/min (Constant), f = 0.08 mm/rev,
  Wet (Workpiece: SCM 415 (ø 50)  Blade width: 3 mm (PM Chipbreaker))
  *(User evaluation)*

**Maximum coolant pressure: 7 MPa**

**Note**
- The KTKTB type is compatible with internal coolant with an optional internal connector. (~ 1 MPa)
- Refer to page 9 for the supply method (Type C).
### Applicable Inserts

<table>
<thead>
<tr>
<th>Shape</th>
<th>Description</th>
<th>Dimensions (mm)</th>
<th>Angle</th>
<th>Carbide</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CW</td>
<td>RE</td>
<td>PSIR</td>
</tr>
<tr>
<td></td>
<td>General use</td>
<td>2.0</td>
<td>0.20</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.0</td>
<td>0.25</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.0</td>
<td>0.30</td>
<td>-</td>
</tr>
<tr>
<td>Tough Edge</td>
<td>PKM 20N-020PM</td>
<td>2.0</td>
<td>0.20</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.0</td>
<td>0.25</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.0</td>
<td>0.30</td>
<td>-</td>
</tr>
</tbody>
</table>

### Recommended Cutting Conditions Table

**1st recommendation ★**

<table>
<thead>
<tr>
<th>Workpiece</th>
<th>Cutting speed (V_c) (m/min)</th>
<th>Feed (f) (mm/rev)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Steel (SxxC, etc.)</td>
<td>80 ~ 220</td>
<td>0.08 ~ 0.18</td>
<td>Wet (External coolant)</td>
</tr>
<tr>
<td>Alloy Steel (SCM etc.)</td>
<td>70 ~ 200</td>
<td>0.06 ~ 0.12</td>
<td>0.05 ~ 0.12</td>
</tr>
<tr>
<td>Stainless steel (SUS 304, etc.)</td>
<td>60 ~ 150</td>
<td>0.08 ~ 0.18</td>
<td>0.08 ~ 0.15</td>
</tr>
<tr>
<td>Cast Iron (FC, FCD, etc.)</td>
<td>-</td>
<td>50 ~ 100</td>
<td>-</td>
</tr>
<tr>
<td>Aluminum alloy</td>
<td>-</td>
<td>200 ~ 450</td>
<td>-</td>
</tr>
<tr>
<td>Brass</td>
<td>-</td>
<td>100 ~ 200</td>
<td>-</td>
</tr>
</tbody>
</table>

Reduce feed to 1/2 ~ 1/3 at the center of the workpiece.

### Case Studies

**Rings Forging**

- \(V_c = 90\) m/min
- \(f = 0.18\) mm/rev
- Wet (External coolant)
- Overhang amount: 70 mm

**Machine part SNCM20**

- \(n = 1,530\) min\(^{-1}\) (Constant)
- \(V_c = 100\) m/min
- \(f = 0.09\) mm/rev
- Wet (External coolant)
- Extrusion: 23 mm

**KPK**

- \(f = 0.18\) mm/rev

**Competitor G**

- \(f = 0.09\) mm/rev

KPK showed good chip control and finished surface with increased feed rates. The machining efficiency ratio was doubled. KPK improves insert mounting speeds.

**Tool life**

- KPK
  - 1,500 pcs/corner (Stable)

**Competitor H**

- 800 pcs/corner (Unstable)

Competitor H was unstable with a sudden fracture. KPK increased tool life by 1.8 times that of competitor. Stable machining with good cutting edge.
### Blades

#### KPKB - JCT With Coolant holes

![Diagram of KPKB - JCT With Coolant holes](image1)

#### Blade dimension

<table>
<thead>
<tr>
<th>Description</th>
<th>Cutting Dia.</th>
<th>Dimensions (mm)</th>
<th>Blade width (mm)</th>
<th>Shape</th>
<th>Insert Wrench</th>
<th>Parts</th>
<th>Applicable Inserts</th>
<th>Applicable Tool Holder Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPKB 26-2</td>
<td>50</td>
<td>40</td>
<td>26</td>
<td>1.8</td>
<td>2.0</td>
<td>Fig. 1</td>
<td>LPW-5</td>
<td>PKM20…</td>
</tr>
<tr>
<td>26-3</td>
<td>75</td>
<td>50</td>
<td>26</td>
<td>1.8</td>
<td>2.0</td>
<td>Fig. 1</td>
<td>CCP-4</td>
<td>PKM30… PKM40…</td>
</tr>
<tr>
<td>26-4</td>
<td>80</td>
<td>50</td>
<td>26</td>
<td>1.8</td>
<td>2.0</td>
<td>Fig. 1</td>
<td>CCP-4</td>
<td>PKM20… PKM30… PKM40…</td>
</tr>
<tr>
<td>KPKB 32-2</td>
<td>50</td>
<td>59</td>
<td>32</td>
<td>1.8</td>
<td>2.0</td>
<td>Fig. 1</td>
<td>CCP-4</td>
<td>PKM20… PKM30… PKM40…</td>
</tr>
<tr>
<td>32-3</td>
<td>100</td>
<td>59</td>
<td>32</td>
<td>1.8</td>
<td>2.0</td>
<td>Fig. 1</td>
<td>CCP-4</td>
<td>PKM20… PKM30… PKM40…</td>
</tr>
</tbody>
</table>

*1 OHX: Maximum overhang length while using internal coolant

*2 H: Length between virtual vertices

See page 8 for insert mounting and removal instructions.

When using internal coolant with KTKTB, KTKTBF type tool holder blocks, coolant supply piping (CCN-5) sold separately.

Pressure: 7 MPa

#### KPKB Without coolant hole

![Diagram of KPKB Without coolant hole](image2)

#### Blade dimension

<table>
<thead>
<tr>
<th>Description</th>
<th>Cutting Dia.</th>
<th>Dimensions (mm)</th>
<th>Blade width (mm)</th>
<th>Shape</th>
<th>Parts</th>
<th>Applicable Inserts</th>
<th>Applicable Tool Holder Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPKB 26-2</td>
<td>50</td>
<td>25</td>
<td>26</td>
<td>1.8</td>
<td>2.0</td>
<td>Fig. 2</td>
<td>LPW-5</td>
</tr>
<tr>
<td>26-3</td>
<td>75</td>
<td>25</td>
<td>26</td>
<td>1.8</td>
<td>2.0</td>
<td>Fig. 2</td>
<td>LPW-5</td>
</tr>
<tr>
<td>26-4</td>
<td>80</td>
<td>25</td>
<td>26</td>
<td>1.8</td>
<td>2.0</td>
<td>Fig. 2</td>
<td>LPW-5</td>
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<tr>
<td>32-2</td>
<td>50</td>
<td>27</td>
<td>32</td>
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<td>2.0</td>
<td>Fig. 2</td>
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<td>100</td>
<td>27</td>
<td>32</td>
<td>1.8</td>
<td>2.0</td>
<td>Fig. 2</td>
<td>LPW-5</td>
</tr>
</tbody>
</table>

*1 OHX: Maximum overhang length while using internal coolant

*2 H: Length between virtual vertices

See page 8 for insert mounting and removal instructions.

Pressure: 7 MPa
# Tool holder block

## KPKTB-JCT  Coolant with holes

![KPKTB-JCT diagram](image)

### Tool holder block dimensions

<table>
<thead>
<tr>
<th>Description</th>
<th>Stock</th>
<th>Dimensions (mm)</th>
<th>Clamp set</th>
<th>Screw</th>
<th>Wrench</th>
<th>O-ring</th>
<th>Plug 1</th>
<th>Plug 2</th>
<th>Applicable blade</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPKTB 20-26JCT</td>
<td>20 33 12.4 19 39 4 23.5 86</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BCS-2</td>
</tr>
<tr>
<td>20-32JCT</td>
<td>20 41 16 40 25 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>H6x16</td>
</tr>
<tr>
<td>25-32JCT</td>
<td>25 5 29 50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BCS-4</td>
</tr>
<tr>
<td>32-32JCT</td>
<td>32 5 29 50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Standard Stock
- Includes only one HSG1/8X8.0 plug.
- KPKTB-JCT type block is also compatible with conventional KTKB type blades.
- See page 10 for coolant piping parts.
- When using internal coolant, the coolant may appear to leak slightly, but this should not affect machining performance. (If the O-ring is damaged, order separately.)

## KTKTB/KTKTBF  Without coolant holes

### KTKTB

![KTKTB diagram](image)

### KTKTBF  (Square type)

![KTKTBF diagram](image)

### Tool holder block dimensions

<table>
<thead>
<tr>
<th>Description</th>
<th>Stock</th>
<th>Dimensions (mm)</th>
<th>Clamp set</th>
<th>Screw</th>
<th>wrench</th>
<th>Applicable blade</th>
</tr>
</thead>
<tbody>
<tr>
<td>KTKTB 16-26</td>
<td>16 13 15.5 31.5 36 86</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BCS-2</td>
</tr>
<tr>
<td>20-26</td>
<td>20 13 19 38 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BCS-3</td>
</tr>
<tr>
<td>25-32</td>
<td>25 8 23 42 110</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BCS-4</td>
</tr>
<tr>
<td>32-32</td>
<td>32 5 29 48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KTKTBF 25-32</td>
<td>25 9.5 25 102 25 84.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BCS-5</td>
</tr>
<tr>
<td>32-32</td>
<td>32 2.5 32 117 99.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Standard Stock
- Can be used with internal coolant by utilizing compatible coolant piping (CCN-5).
How to mount and remove the insert

1. Insert provide wrench and turn upwards as shown in (Fig. 1)
2. Slide insert into the blade's insert pocket from the front and push in until the back of the insert contacts the blade's back stop surface. (Fig. 2)

   Completely eliminate chips from the insert pocket and the wrench insertion area by using compressed air.

   Check to make sure the insert is straight and not tilted.

   When removing the insert, follow the same procedure as shown in Fig. 2.

   **Fig. 1 Wrench Usage**

   **Fig. 2 Mounting Method**

Installation Guide

1. Attach the tool holder block body to the machine tool rest
2. Install the blade into the tool block body
3. Fasten the clamp set with screws
4. When mounting the tool holder block, use a wrench or spanner as shown below for a small lathe. Please note that the space for fastening may be small.

How to install the tool holder block and blade

Correct blade installation

Incorrect blade installation

Incorrect Clamp Set Orientation

If the clamp set is mounted in the reverse direction, a large gap is created between the tool holder block main body and the clamp set as shown in the left figure. If you continue to use the product, the blade may break off. Reinstall in the correct orientation.

Lead Angle Direction and Usage

1. If there is no restriction on the finished shape, use an insert without lead angle.
2. Insert with lead angle is recommended to prevent remaining boss.
3. If you want to make the remaining boss smaller when machining small or thin parts, use insert with lead angle.

<table>
<thead>
<tr>
<th>Handed insert with lead angle</th>
<th>Right hand (R) Lead</th>
<th>Neutral</th>
<th>Right hand (R) Lead</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (Neutral)</td>
<td>PSIRR</td>
<td>PSIRL</td>
<td>PSIRR</td>
<td>PSIRL</td>
</tr>
</tbody>
</table>

Inserts with lead angle (PSIR R/L) reduce burrs at cut-off machining.

The larger the lead angle (PSIR R/L), the smaller the cutting force.

The feed also needs to be smaller.

Solid Workpiece

Hollow Workpiece (Pipe)

Machining Precautions

1. Set cutting edge height 0.1mm above core height.
2. Machining with ample supply of coolant is recommended
3. Machine at constant speeds to gain stable tool life
4. Make the cut-off as close as possible to the chuck
5. To prevent impacts, reduce feed rate by 1/2 ~ 1/3 when nearing the center of the workpiece

Excessive use of the insert may cause chipping or damage to the holder.
Internal coolant supply method

**A : Coolant Hose Assembly**

See page 10

**B : VDI Holder Assembly**

(Internal coolant type)

Maximum coolant pressure: 7 MPa

**C: Coolant Pipe Assembly**

See page 10

Coolant supply pipe mounting method

Attach to the blade with the supplied screw

Form pipe to the required shape and connect it to the piping of the machine.

Precautions

When mounting KPKB-JCT blade

When using internal coolant, keep the arrow (▼) on the blade within the range marked on the tool holder block.

![Diagram](image)

When the cap and coolant supply pipe are mounted

Coolant cannot be supplied correctly if it is mounted in the wrong position.

Cap CCP-4

SB-4065STR (3.0N·m)

Coolant supply pipe CCP-5

SB-4085TR (1.5N·m)

When using a tool holder block

When using the discharge port B1 (B2), use a sealant for the filler cap (HSG 1/8 X 8.0) of the accessory part of the coolant supply port A1 (A2).

Coolant supply pipe (G1/8)

Fill port A2

Fill port B2

Fill port B1

Fill port A1

Maximum coolant pressure: 7 MPa

Maximum coolant pressure: 1 MPa
**A : Coolant Hose Assembly**

**Connection method and piping parts**

Easy to use with high-pressure hose and joint
Can be used for internal coolant at normal pressure without a high pressure pump unit
Banjo bolts (for angled hoses) are also available.

**<Piping Installation Guide>**

- **1. Joint/Banjo bolt** (Sold separately)
  - **Pressure resistance:** ~ 30 MPa
  - **Shape**
  - **Description**
  - **Stock**
  - **Thread standard**
    - Toolholder machine connection side
  - **Dimension**

- **2. Washer** (Sold separately)
  - **Pressure resistance:** ~ 30 MPa
  - **Shape**
  - **Description**
  - **Stock**
  - **Thread standard**
  - **Dimensions (mm)**

- **3. Hose** (Sold separately)
  - **Pressure resistance:** ~ 30 MPa
  - **Shape**
  - **Description**
  - **Stock**
  - **Thread standard**
  - **Dimensions (mm)**

**Precautions**
1. Make sure machine door is completely closed before use of these parts.
2. Use appropriate seal for the male thread of the piping parts and make sure the connection is secure. Use plugs to seal off unused coolant holes.
3. Connect and fasten the coolant hose firmly.
4. The use of copper washers may cause leakage but will have no effect on the performance.
5. Commercial piping parts can be used if the thread standards are same. Check the pressure resistance before use.
6. Regularly changing the coolant filter is recommended.

**C: Coolant Pipe Assembly**

**Piping parts**

**Coolant supply pipe** (Sold separately)

- **Pressure resistance:** 1 MPa

Use wrench (FT-15); supplied with the blade when connecting.