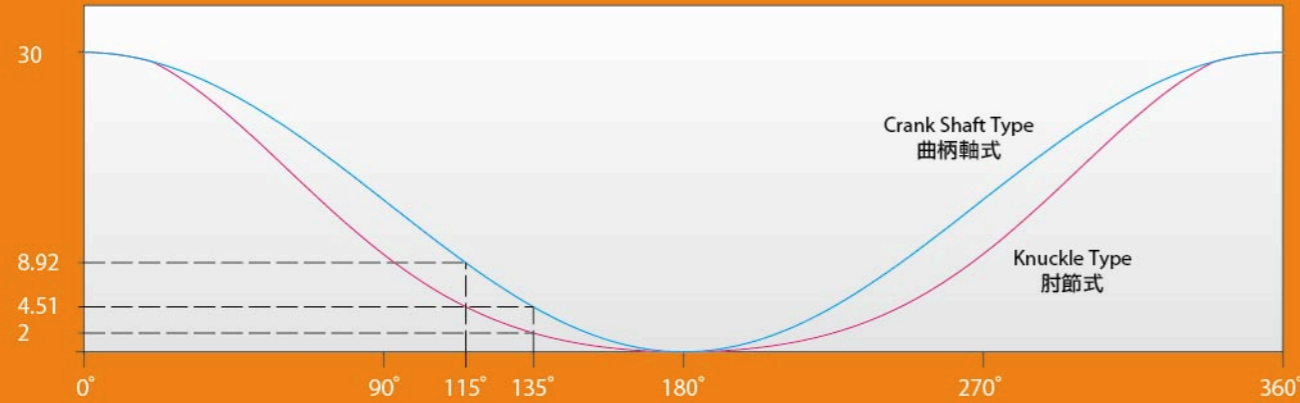


Slide block displacement comparison diagrams between knuckle type and crank shaft type press.

肘節式沖床與曲柄式沖床滑塊機構位移量曲線圖



SPECIFICATIONS 主要規格

ITEMS 項目	MODEL 機型	GL-100	GL-160	GL-260	GL-360
Nominal press capacity 公稱作用力	tons	100	160	260	360
Stroke 衝程	mm	Max.30	Max.30	Max.30	Max.30
Capacity occur point 能力發生點	mm	2.0	2.0	2.0	2.0
Strokes per minute 衝程速	s.p.m.	100-500	100-500	75-350	75-300
Bolster area 工作台面積	mm	1300×700	1500×750	1900×850	2300×1000
Bolster hole 下料孔	mm	1000×150	1200×200	1600×250	2100×370
Slide area 滑座面積	mm	1360×550	1560×600	1960×700	2380×900
Die height adjustment 模高調整行程	mm	380×420	380×420	380×440	380×440
Slide adjusting motor 模高調整馬達	kw	0.75	0.75	1.5	1.5
Linear height 送料線高度	mm	200 ±20	200 ±20	220 ±30	220 ±30
Main motor 主馬達	kw	22	30	37	55
Specified angle stop jog control 寸動指定角度停止功能		○	○	○	○
Stroke stop setting at 0° & 90° in single & continuous operation 單動連動0°及90°定位功能		○	○	○	○
Monitor control 螢幕式操作台		○	○	○	○
Parameters memory capacity 生產參數記憶	sets 組	10	10	10	10
Air blow 吹料裝置		☆	☆	☆	☆
Stack & stage control 疊層及階段控制	Max.2 sets 組	☆ 8 output/set			
Skew slot control 扭轉斜槽控制	Max.2 sets 組	☆ 1 step motor/set			
Front & back safety door 前後面安全門		☆	☆	☆	☆
Speed control by frequency inverter 變頻器調速控制		☆	☆	☆	☆
Hydraulic die lifter 油壓舉模裝置		☆	☆	☆	☆
Die arms 移臂模		☆	☆	☆	☆
Hydraulic die clamping device 油壓夾模裝置		☆	☆	☆	☆
Quick left slide device 滑座快速上昇裝置	mm	☆ 40	☆ 40	☆ 50	☆ 50
Anti-vibration device 防震腳座裝置		☆	☆	☆	☆

Note: ○ standard accessories, ☆ optional equipment. 註: ○ 標準配備, ☆ 選購配備。

■ Specifications and design characteristics are subject to change without prior notice.

■ 本公司對產品規格, 設計特性均不斷研究改進, 上述規格若有變更, 恕不另行通知。



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DESIGNED BY FAIR OAKS 886-4-2563-2320

Knuckle Type High Speed Precision Press

Featuring High Speed, Precision, Safety, and Durability.

肘節式高速精密沖床



FAIR OAKS PRECISION MACHINERY CO., LTD.

Knuckle Type High Speed Precision Press

肘節式高速精密沖床

MACHINE FEATURES

FRAME

- Manufactured from high tensile cast iron, stress relieved for maximum rigidity and long term accuracy.
- The frame structure is designed by means of "Computerized finite element analysis". It provides optimum design for frame strength and strain.
- The frame is tightened by tie-rods, incorporating with hydraulic preload on structure for giving added rigidity.

MINIMUM VIBRATION, MINIMUM NOISE

- Outstanding dynamic balancing design reduces vibration and noise to a minimum.

LUBRICATION SYSTEM

- Employs a forced lubrication with cooling system to minimize thermal strain of machine frame, upgrade stamping quality and extend service life of the machine. The lubrication system is provided with a pressure detection device.

機械特性

機座

- 採用高強度鑄鐵，經應力消除，確保長期精度。
- 機構設計採用「電腦有限元素分析法」，因此對結構之強度及應變得以確保最佳設計。
- 機架之連結，使用螺椿緊固並應用油壓動力，將機架結構預壓，大幅提升機架之剛性。

低振動、低噪音

- 優異的動態平衡設計，將振動與噪音降到最低，並可確保模具壽命。

潤滑系統

- 本機採用強制潤滑冷卻系統，可降低機座熱應變，並確保沖壓工件品質，延長機械壽命。附有壓力檢出功能。

USER-FRIENDLY CONTROL

Fair Qaks knuckle type high speed precision press is equipped with an advanced conversational control. The specially designed software features extremely powerful control functions. Outstanding conversational control is user-friendly and assures maximum operation convenience.

- Memory capacity is of up to 10 sets of machining datas.
- Conversational operation control.
- Self-diagnostic function combined with error message display makes maintenance with ease.
- Conversational trouble shooting greatly shortens maintenance time and the machine downtime.
- Most functions are controlled through the screen eliminating numerous keys control.

最簡易的人機介面控制

高將全新系列之肘節式高速精密沖床配備先進的對話式人機介面控制。獨特設計的軟體系統具有超強功能。採用對話式控制，機械操作更具人性化、更簡易。

- 電腦可記憶10組加工資料。
- 對話式操作導引。
- 具故障自我偵測功能及故障顯示，維修方便。
- 對話式故障排除，大幅縮短維修時間，節省停機時間。
- 大部份功能由螢幕操控，免除許多按鍵之麻煩。



OUTSTANDING FEATURES OF KNUCKLE TYPE STRUCTURE

The specially designed knuckle type structure permits extremely uniform punching load on the head. This greatly reduces punching torque applied on the head, resulting in a minimum structural deformation.

The knuckle type structure features superior motion curve, which effectively reduces the mold impact and speed against the material. Impact speed reduces up to 40%.

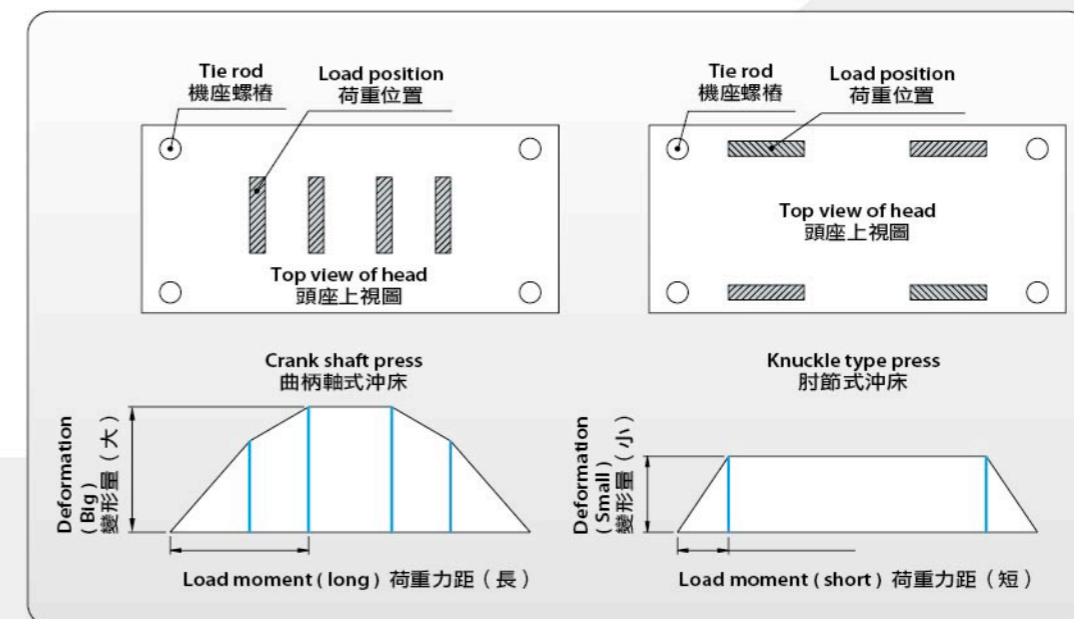
肘節機構特點

獨特對稱式肘節機構設計，將其沖壓負荷平均分佈於頭座剛體上。因此頭座所承受沖壓力距大幅縮短，機械結構變形量降低到最低程度。

肘節式機構特優的運動曲線，有效的降低模具沖頭接觸材料的速度及衝擊力，其速度減低40%。

Head Deformation Diagrams

頭座結構變形說明圖示

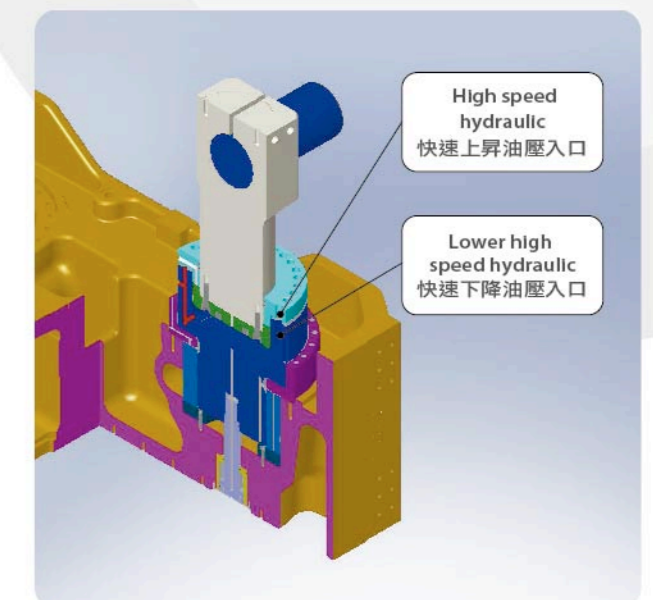


HIGH SPEED ACCELERATOR OF THE SLIDE (OPTIONAL EQUIPMENT)

The high speed accelerator of the slide provides the operator with a convenient method of checking and fixing mold/die problems. If stock feed errors occur, this prevents damage or loss to the mold edge and punch. Safety and convenience are immensely improved as the patented hydraulic loop design of the slide accelerator overcomes jumping scrap and set-up errors that cause load and sticking problems.

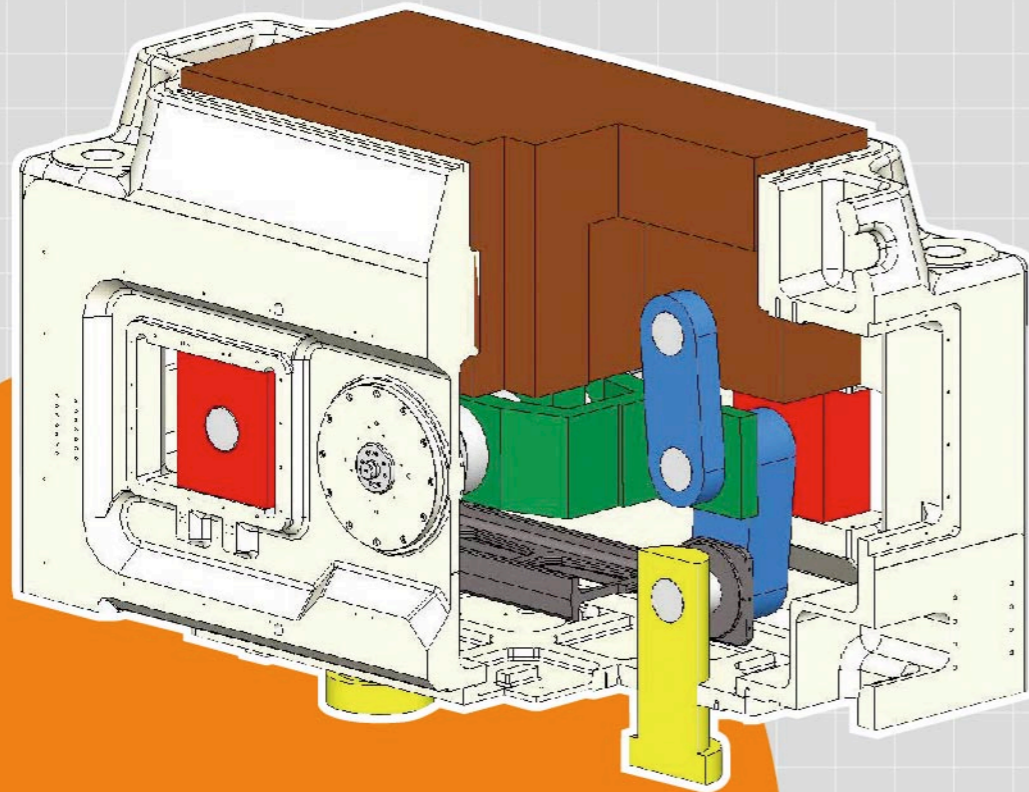
滑座快速上昇裝置 (選購配備)

敏捷的滑座快速上昇裝置，提供操作者更方便的模具線上查修及檢視，同時於材料誤送時避免模具二次剪切再次損傷模具刃口及沖頭。其滑座快速上昇裝置專利之油壓迴路設計，克服了沖壓材料跳屑及模高設定錯誤所造成的沖壓過負載及下死點黏模之問題，進而大幅提高沖壓作業的安全性及便利性。



Structural overview of knuckle type high speed precision press

肘節式沖床結構示意圖



KNUCKLE TYPE HIGH SPEED PRECISION PRESS : STRUCTURE AND OPERATION

1. Kinetic energy produced by the flywheel passes through the clutch and rotates the crankshaft (1) in a clockwise direction.
2. Eccentric geometric sections of crankshaft (1) at linkage (A) and linkage (B) drive the crankshaft connecting rods (2).
3. Column blocks (3) move in a horizontally symmetrical, reciprocating motion. Slides (4) and tandem pillar connecting rods (5) attach through the central hole of the column block (3) with dynamically balanced connecting rods (8). The opposite ends of the pillar connecting rods (5) are connected to the guide post (6) and pillar tension bar (7) that ensures the horizontal gap (X) remains constant. Changes in the vertical gap (Y) result, forming the press stroke.

肘節式沖床結構及動作說明

1. [飛輪] 動能經由 [離合器] 傳至件(1) [曲柄軸] 作順時針方向旋轉運動。
2. 件(1) [曲柄軸] 為偏心幾何零件，於本零件上各有偏心節點(A)與偏心節點(B)，各牽動件(2) [曲柄軸連桿] 帶動件。
3. (3) [柱梢滑塊] 作左右對稱水平往復運動，件(3) [柱梢滑塊] 中心孔安裝件(4) [滑軸] 並串接件(5) [導柱連桿] 及件(8) [動態平衡連桿]，由於件(5) [導柱連桿] 另外一端連接件(6) [導柱] 及件(7) [導柱拉桿]，使其左右配置距離(X)不變，致使上下距離(Y)的尺寸變化，因而形成沖壓行程。

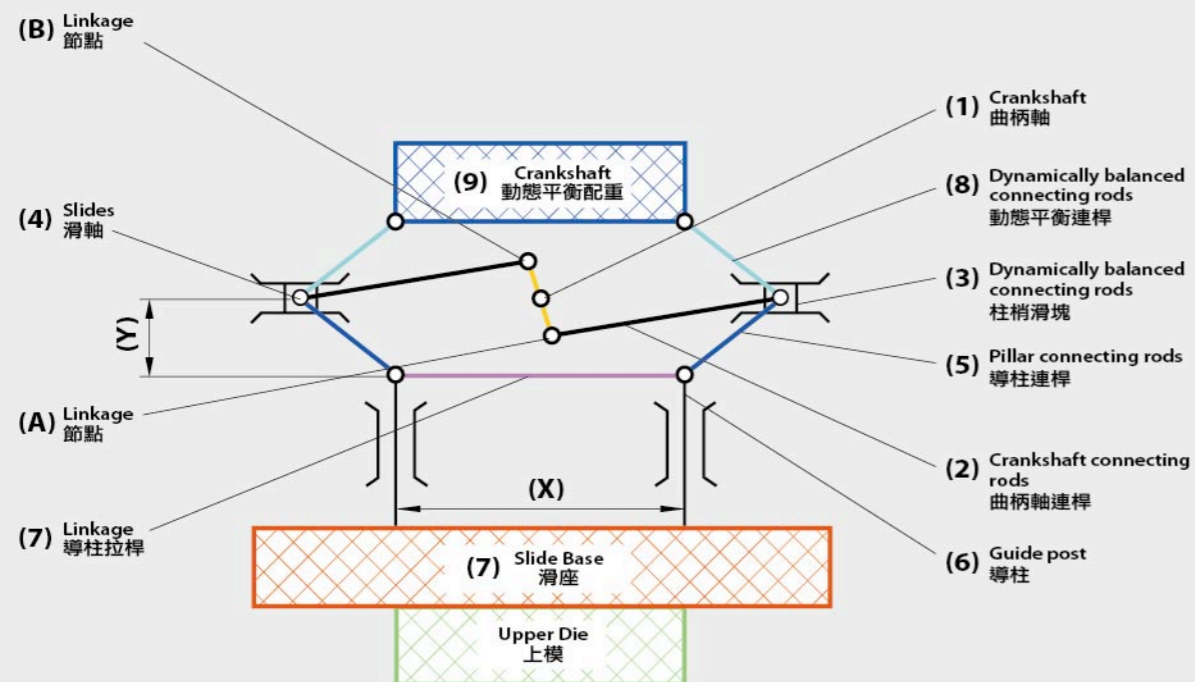
DYNAMIC BALANCE DEVICE

The purpose of installing the dynamic balance device is to balance the slide block and upper mold. During production, vertical motion produces momentum and equips the upper mold with a weight bearing capacity and improves overall dynamic balance of the press. The diagram below illustrates the entire design of the dynamic balance device and design of the vertical guide retaining bracket, demonstrating dramatically improved stability and working life of the press.

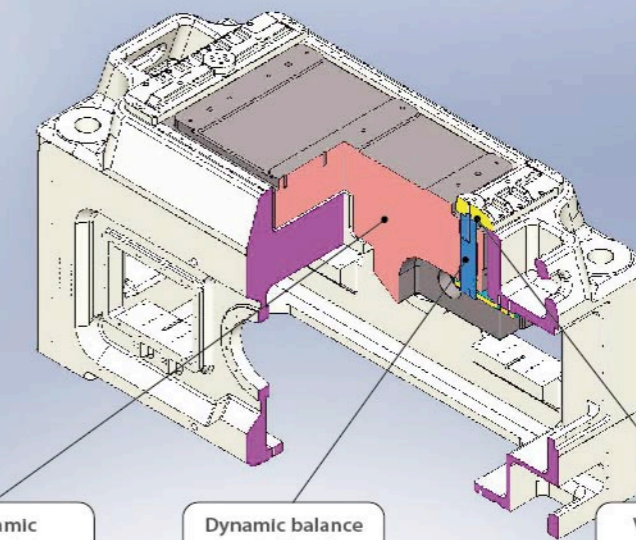
動態平衡裝置

動態平衡裝置設立之目的為平衡沖床滑座及模具上模，於沖壓作業時上下運動時所產生之動量及配置上模所容許之承載重量，進而提昇動態之平衡性。因此於下圖所示，動態平衡裝置整體式之設計及導正桿上下固定之樣式設計，均大幅的提昇其壽命及穩定性。

Knuckle Type High Speed Precision Press Featuring High Speed, Precision



Dynamic balance device 動態平衡裝置



Dynamic balance device 動態平衡裝置

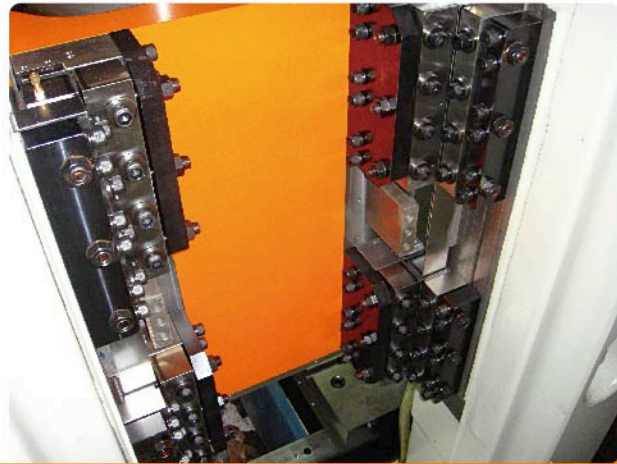
Dynamic balance vertical guide 動態平衡導正桿

Vertical guide retaining bracket 導正桿上下固定座

SLIDE BASE DESIGN

The main function of the load bearing slide base is to support the slide during eccentric press loads caused by side thrust, and to ensure perpendicularity and parallelism during vertical motion of the slide.

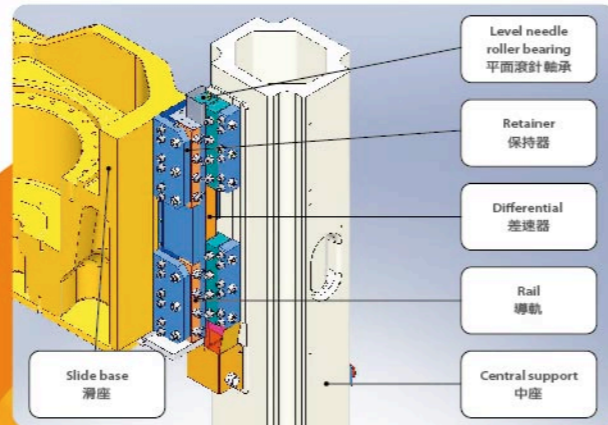
The present design features four groups of octahedral level needle roller bearings, knuckle needle roller bearings, retainer, differential, and slide base all compose precision components. Via the stationary traction guide of the retainer, as well as the differential actuator, the lightweight needle roller bearings ensure that differential motion remains even throughout, as well as avoid inertia from load related structural damage to the retainer during vertical motion of the slide. This design exhibits large load capacity of the needle roller bearings, high precision, ease of maintenance and a long service life.



滑座導軌設計說明

滑座滑軌主要承載滑座於偏心沖壓負載時之側向推力，及確保滑座上下運動之垂直度與平行度。

目前之設計為四組八面之平面滾針軸承組，由平面滾針軸承及保持架、差速器、導軌等精密零件所組成。其特點為平面滾針軸承質量輕且經由保持器之固定牽引導正及差速器之引動於滑座，上下運動時得以確保同步差速之運動，避免因自重所形成之慣性慣量力破壞本身保持器。再由於其平面滾針軸承負載容量大、精度高、保養簡易、壽命長等特點，故特予採用於本設計中。



HYDROSTATIC BEARING

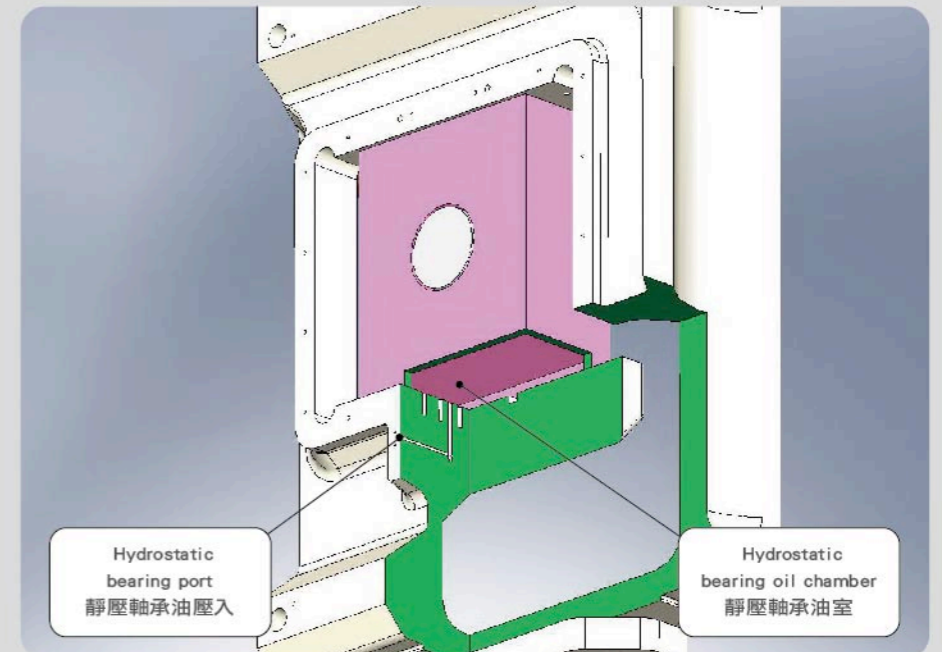
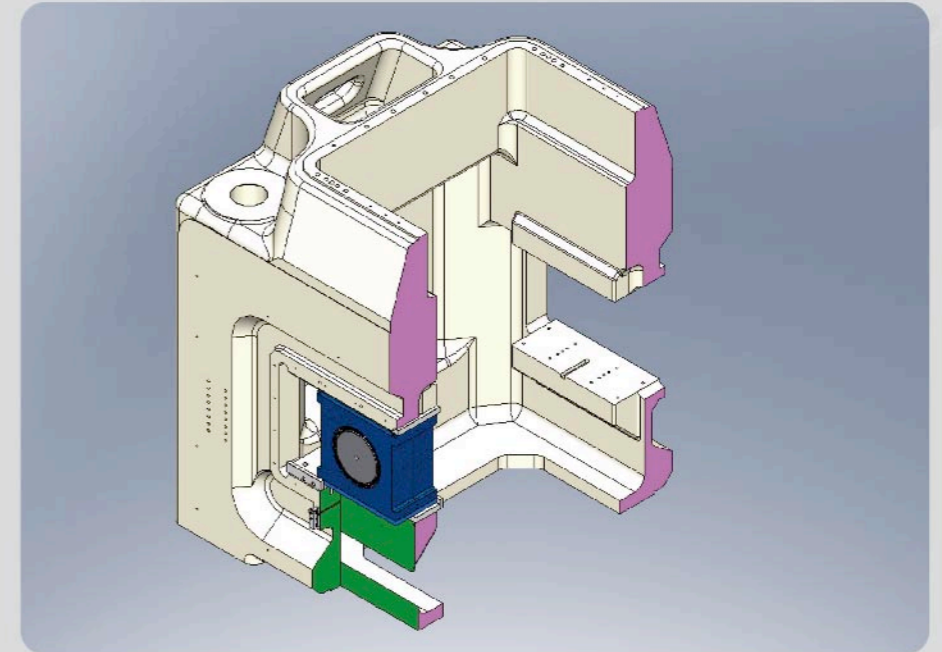
As the diagram below illustrates, when load is transmitted through the column slide block to the headstock on the lever type press, it passes punch load through the hydrostatic bearing which occupies the space between the column slide block and the headstock.

The hydraulic oil used by the hydrostatic bearing minimizes the friction coefficient, maximizes vibration damping, while load capacity, rigidity, and precision are very high. In contrast to the hydrostatic bearing design of general presses, wear and tear during production caused by mold and bearing brass sticking, high vibration etc. are overcome and ameliorated.

靜壓軸承特性

由肘節式沖床結構示意圖所述，當沖壓負載經由柱梢滑塊傳動至頭座時，柱梢滑塊與頭座間將透過靜壓軸承承載此負載。

由於靜壓軸承使用液壓油作為介質，因此其磨擦係數非常低及振動衰減性高、負載容量大、高剛性、高精度等特性，而相對於一般沖床的動壓軸承設計，在沖壓時所產生之下死點黏模現象及銅襯黏滯磨損、高振動等情況均得以克服及獲得改善。



ion, Safety, and Durability.

