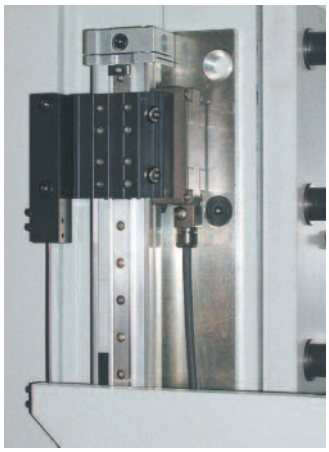
LVD®
STRIPPIT

PRESS BRAKES

PPEB

The Ultimate CNC Hydraulic Press Brakes



Meeting the demands of a constantly changing marketplace requires flexibility, reliability and the use of advanced production techniques that ensure end-product quality.

Flexible automation has become a key element in the success of any manufacturer. LVD Strippit PPEB press brakes represent the latest technology in press brake automation, providing industry with the means to respond to an ever-evolving marketplace.

Features such as these help PPEB press brakes lead the way in process automation:

User-friendly PC-based CNC Control

- Powerful CADMAN®-CNC PC-based Windows® Control ensures fail-safe operation of the machine while offering the operator considerable assistance in part programming
- Exclusive CADMAN-B 3D bending software allows automatic programming of the part and precise determination of the blank size
- Bending sequences are automatically determined from the user-drawn 2D part created with the simple-to-use graphics editor

- All axes of the press brake, including the CNC crowning system, are calculated by the control and are automatically positioned for optimum bending results
- 2D & 3D color graphics simulate part creation and display material handling sequencing for optimum part production
- Tool libraries and interactive databases are maintained automatically for application of the precise bend allowance factors and angle correction values, ensuring accurate first time bends with minimal or no trial bending

- Manual Data Input (MDI) method operation simplifies the task of minor changes to existing part programs or the quick production of simple parts
- Fastest and most accurate way to produce parts on a press brake today
- Provided with the basic data needed for the operator to begin successfully using the machine from the very first day
- Complete online Spare Parts Catalog, providing quick, easy reference to detailed drawings, descriptions and part numbers for all PPEB replacement parts

Rigid Frame Design

- Press brakes up to 350 tons are designed and built utilizing a welded one-piece frame, machined without repositioning and stress relieved by vibration, guaranteeing machine precision
- Hydraulic cylinders are machined from a solid steel billet
- Pistons are steel forgings, precision ground and micropolished for years of trouble-free service

Microprocessor Technology for Optimum Precision

- Servo-controlled using state-of-the-art hydraulics and electronics to ensure perfect control of the bending process
- Double bed referenced encoders are connected to the bed in such a way that deformation of the side frames during bending does not influence the positioning accuracy of the upper beam (Y1, Y2)

Easy-Form® Laser Measuring System

- Patented system (US 6 727 986 B1) allows exact measurement of the angle during the bending process
- Laser sensing mechanism tracks the plate during the bending process and transmits the digital information in real time to the CNC control unit
- CNC unit processes the information and subsequently recalculates the depth adjustment to obtain the correct angle in real time—with no process interruption and no loss of production time

Programmable Crowning System V-axis

- CNC crowning ensures the ram and table are parallel during the bending operation
- Sheet thickness, length, die opening and tensile strength data are entered into the control
- Force and related deflection of the table and ram are automatically determined, preloading is optimally obtained for each bend

With LVD Strippit PPEB press brakes, you obtain an optimal bending process and excellent bending results – from the first piece.

Windows® is a registered trademark of Microsoft Corporation

Making Bending Easy

With the improvements in recent years in lasers and punch presses, greater demand has been placed on press brakes to produce complex components to a higher degree of accuracy and repeatability. This has increased the emphasis on selecting the right press brake to produce the correct part from the first blank.

The press brake remains a critical machine in the landscape of metal fabrication. The precise ram repeatability and advances in control technology CNC press brakes provide have made "air bending" the desired method of production in the world today.

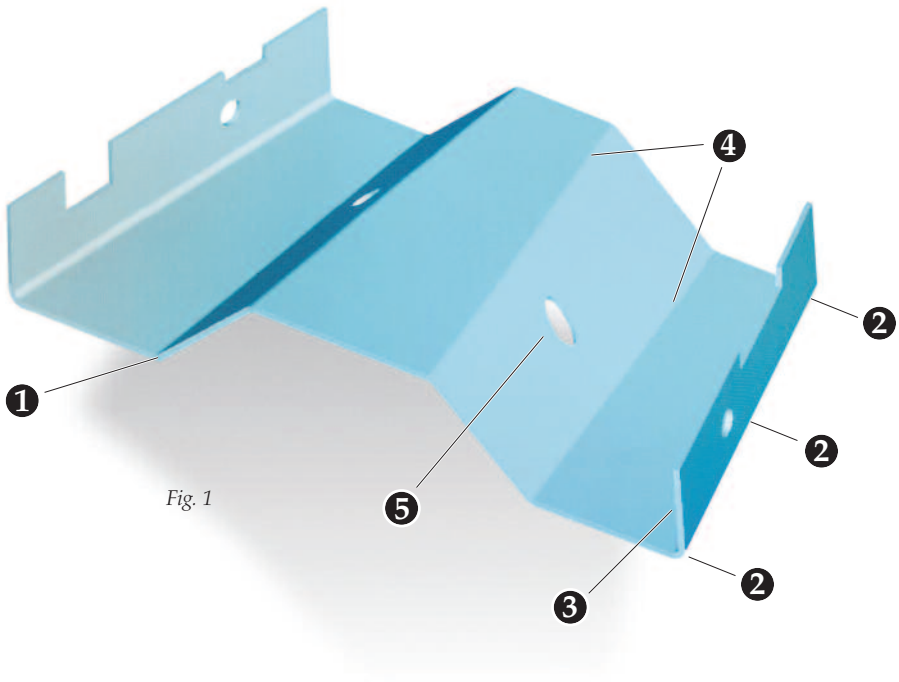


Fig. 1

Criteria for bending

Regardless of the application and use of available technologies, the production of accurate parts with minimum set-up time must meet and maintain five basic bending criteria. *See fig 1.*
These are:

1. Accurate bend angles
2. Accurate bend angle along bend length
3. Accurate flange length
4. Parallelism of flange length
5. Correct position of internal details

1. Bend angle

All materials used in bending are produced within a certain tolerance range. This non-uniformity and varying dimensional tolerance inherent in all materials is of critical concern when bending. Press brake ram repeatability has always been a key element in producing an accurate bend angle, however the focus on maintaining critical angular tolerances in bending today is no longer the repeatability of the press brake. The focus is on the non-uniformity and varying dimensional tolerances inherent in all materials. Material variation will continue to be a concern in achieving both first article results and consistent parts throughout a production run. If it were possible to control the press brake repeatability to ±"0", this still would not solve the problems effected by varying material conditions. *See fig 2.*

Furthermore, grain direction changes within the part and/or tensile strength variations in the material may also result in loss of bend angle accuracy regardless of ram repeatability accuracy. Changes in grain direction generally result in the creation of different bend radii. This variation in the production of varying bend radii in the same material will result in varying bend angles if the ram position is not adjusted. *See fig 3.*

2. Factors affecting bend angle over the full length

Deflection: The difficulty in maintaining uniform bend angles along the entire length of the bend line is mainly the result of deflection in the machine frame. If the upper and lower beam do not remain parallel during the bending process, the bend angle will differ along the length of the part. *See fig 4.*

Tooling: Tooling is also largely responsible for problems associated with non-uniform angles along a bend line. If the tooling is not precise or is unevenly worn along its length, the result will be a variation in the angle produced.

3. Precise flange dimensions

To produce the correct flange length, the backgauge position must be accurately determined according to bend angle, bend radius, bend allowance, die geometry and material type.

4. Parallel flanges

Valuable time can be wasted setting up the backgauge to assure the production of parallel bends. In some instances, parts may require the bend lines to be non-parallel, in which case additional complexity will be added, and additional time will be spent setting up the back-gauge. Other problems may also hamper the quick and accurate production of either condition. These include tool misalignment, tool wear, or a backgauge that is damaged, inaccurate or out of calibration.

5. Unfolded length & correct position of internal detail

Position of internal detail within a part depends primarily on the accurate application of the bend allowance. Bend allowance or K-factor calculations derived from different sources and used to determine blank development may vary. If the formulas used for calculations vary, blank uniformity will also vary.

All the criteria previously mentioned will effect the position of internal part detail and the development of the precise blank.

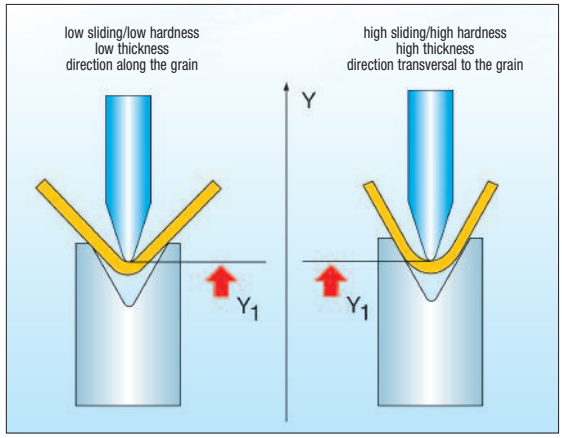


Fig. 3

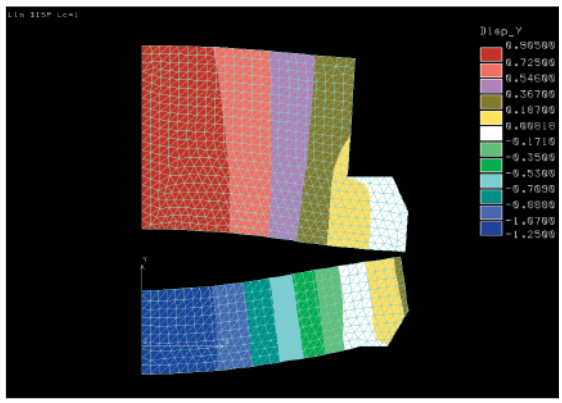


Fig. 4

DEPTH CORRECTION PER DEGREE

Material	.031" (0,8 mm)	.039" (1 mm)	.047" (1,2 mm)	.059" (1,5 mm)	.078" (2 mm)	.098" (2,5 mm)	.118" (3 mm)	.157" (4 mm)
α V	.236" (6 mm)	.314" (8 mm)	.393" (10 mm)	.472" (12 mm)	.629" (16 mm)	.787" (20 mm)	.944" (24 mm)	1.18" (30 mm)
45°	.004" (0,11 mm)	.005" (0,14 mm)	.007" (0,18 mm)	.008" (0,22 mm)	.011" (0,28 mm)	.014" (0,36 mm)	.017" (0,44 mm)	.021" (0,54 mm)
90°	.001" (0,03 mm)	.001" (0,04 mm)	.002" (0,06 mm)	.002" (0,07 mm)	.003" (0,09 mm)	.004" (0,11 mm)	.005" (0,13 mm)	.006" (0,17 mm)
135°	.001" (0,03 mm)	.001" (0,04 mm)	.002" (0,05 mm)	.002" (0,06 mm)	.002" (0,07 mm)	.003" (0,09 mm)	.004" (0,10 mm)	.005" (0,13 mm)

Fig. 2

LVD Strippit Solutions

Fig. 5a

These features of LVD Strippit press brake technology address the problems of bending and ensure the quality of every end product produced.

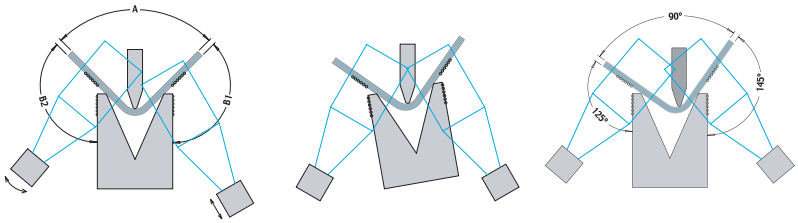
1. Bend Angle

Precision Engineering: The LVD Strippit PPEB precision hydraulic press brakes are designed by "finite elements analysis." All models are equipped with bed-referenced linear encoders and the latest servo-controlled hydraulic systems to ensure precise control of the upper beam position and repeatability.

CADMAN® Control/Software: The LVD Strippit CADMAN®-CNC press brake control assures first time bend angle results by the automatic application of the exclusive CADMAN angle correction database. Previous bending data experience on specific tools and materials are cross-referenced and automatically applied.

Easy-Form® Laser: The patented Easy-Form Laser angle control system controls the bend angle in real time without slowing the bending process. *See fig 5a & b.*

Fig. 5b

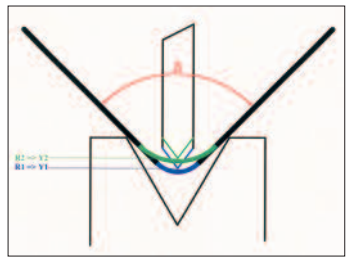


Independent of Measuring Device Distance

Independent of Die Orientation

Independent of Off-center Bending Conditions

The unique design of the Easy-Form system allows the machine to adapt to variation in material consistency and compensates for any changes in radius as a result of grain direction changes.



First time bend angles and consistent part repeatability are assured.

The Easy-Form Laser system guarantees the desired angle from the first bending operation. The symmetric angle measuring system, located on the front and back side of the press brake table, consists of two laser monitors linked with an expert software database in the CADMAN-CNC control. As the bending sequence of the press brake is initiated, the sensing device transmits the digital information in real time to the CNC control unit, which processes it and subsequently recalculates the correct depth adjustment to obtain the correct angle. The bending process is not interrupted, and no production time is lost.

2. Factors affecting bend angle over full length

Deflection compensation system, V-Axis: The LVD Strippit CNC two-piece wedge deflection compensation system corrects the non-parallel condition of the bed/ram relationship created by deflection of the machine during bending. *See fig 6a, b & c.*

Tooling: LVD Strippit precision-ground tooling, with the patented STONE® radius, assures accurate bend angles along the entire bending length. LVD Strippit STONE tooling is produced with a progressive radius on both sides of the V-opening, allowing the material to flow into the die more evenly and with less drag. This unique design of the V-die reduces the friction between the material and the die encountered when bending, by creating a rolling condition as the material enters the die. *See fig 7a & b.*

STONE tooling also provides:

- Reduced tool wear
- Tool interchangeability
- Reduced residue on stainless steel
- Improved material control
- Reduced tonnage requirements
- Symmetric bending

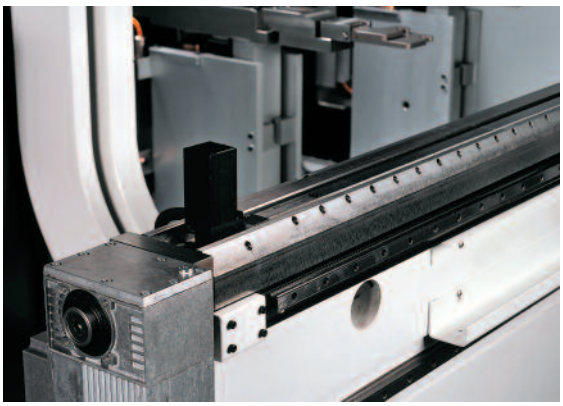


Fig. 6a

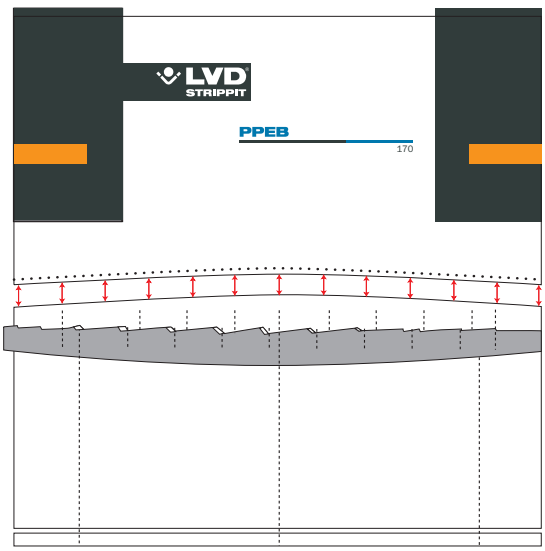


Fig. 6b

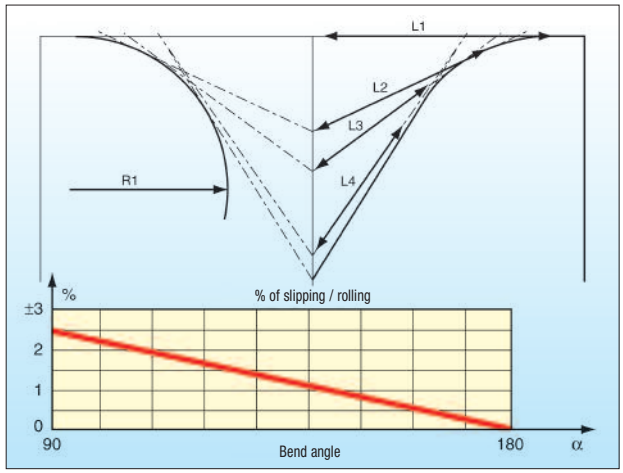


Fig. 7a. Normal radius

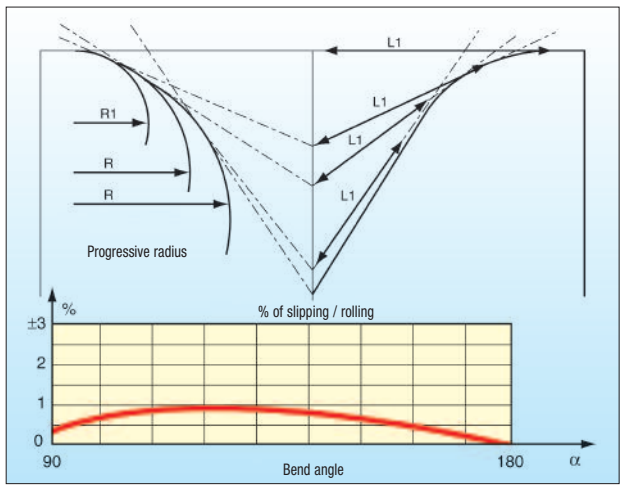


Fig. 7b. STONE radius

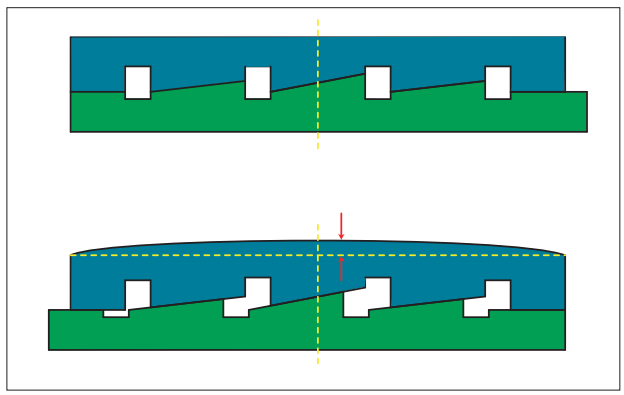


Fig. 6c

LVD Strippit Solutions

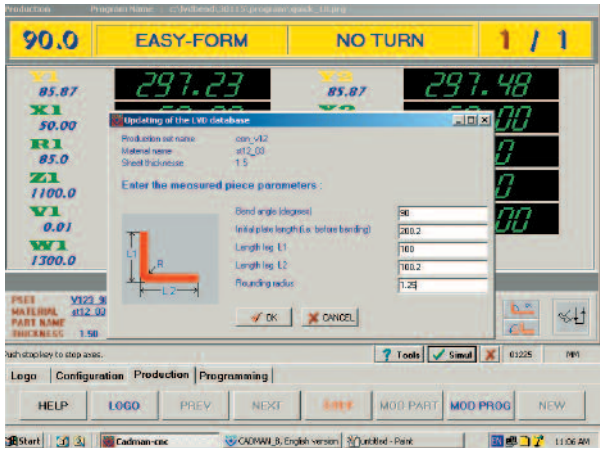


Fig. 8a

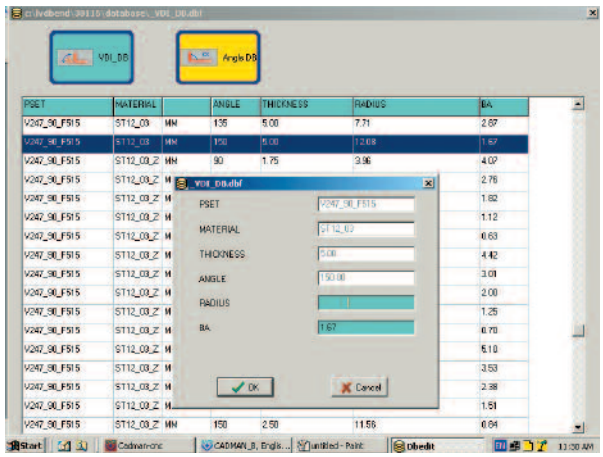


Fig. 8b

3. Precise flange dimensions

LVD Strippit uses the following method to obtain the correct position of the backgauge (with consideration for the bend allowance).

A piece of material of known data (*e.g.* .060'' mild steel, 4"x 4") is entered onto a setup page on the control. *See fig 8a.* After performing a 90-degree bend, the control requests the following information:

- length of leg 1
- length of leg 2
- inside radius

This information is then stored in a database. *See fig 8b.* Now, when programming parts of the same material and tooling parameters, the database information is automatically used to give precise flange lengths the first time. This is possible because the database contains actual proven values and not theoretical values. LVD has performed tests on various types and thicknesses of material, using different V-dies. This data is provided on all machines together with a tooling library on CD-ROM. The customer can add details of any specific material to this database.

4. Parallel flanges

The LVD Strippit design assures precision alignment of the upper punch and lower V-die, allowing quick set-up and changeover time. Backgauge re-calibration is eliminated. All LVD Strippit backgauges use the latest technology AC drives and encoders to ensure the highest possible accuracy and repeatability.

The LVD Strippit five-axis backgauge offers the ultimate in flexibility in the production of both parallel and non-parallel flanges. The unique three-point gauge fingers allow automatic calculation and setting of both the backgauge and side stop positions for accurate part production at any point along the length of the machine. *See fig 9.*

5. Unfolded length and correct position of internal detail

LVD Strippit's CADMAN software automatically applies information from the bend allowance database, making it possible for the user to determine exact positions of internal details and the correct dimensions for the undeveloped blank.

Having proven data from the press brake in advance of blank production means no alterations are necessary to the part throughout its production. Accurate blank development, laser or punch press processing and bending are assured by using proven data provided by the CADMAN software. *See fig 10.*

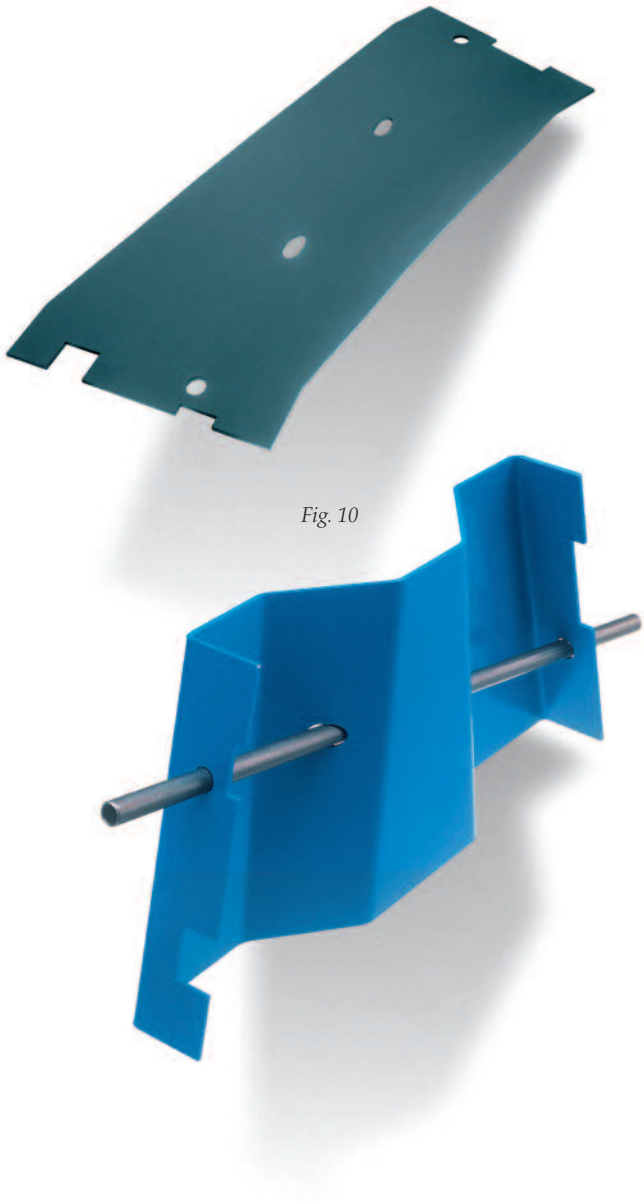


Fig. 10

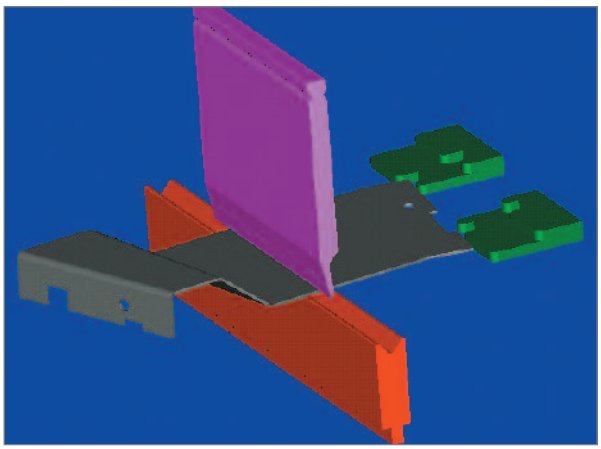
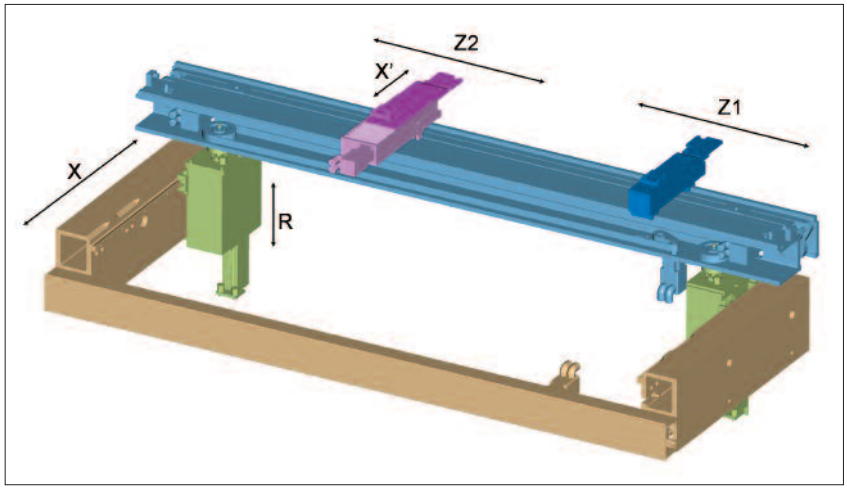


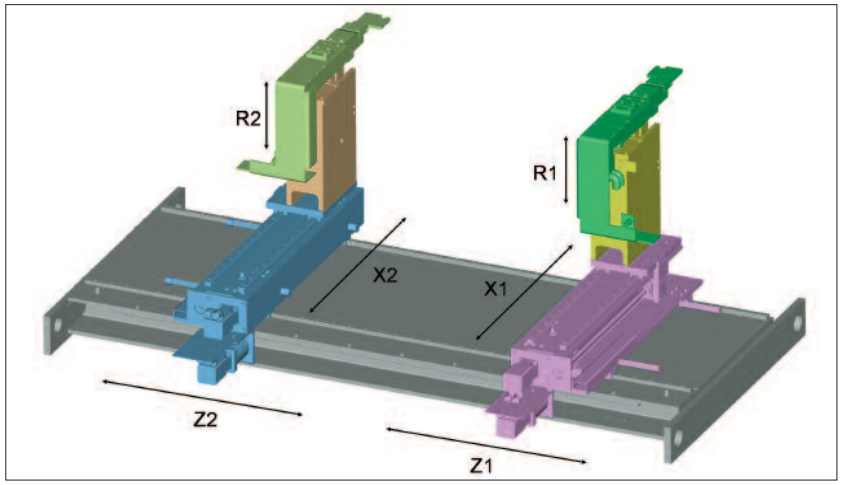
Fig. 9. Three-point gauge fingers

Created with the ACIS® Graphic Kernel from Spatial Technology



Five-axis backgauge X-R-Z1-Z2-X' (standard on PPEB-8)

Whether you require a basic two-axis backgauge or a more complex system to allow multi-bend set-ups and the production of taper bends, LVD Strippit can offer a solution that takes the guess work out of all axis position calculations by using the CADMAN advanced software.



Six-axis backgauge X1R1Z1-X2R2Z2 (PP8250 - PP8251)

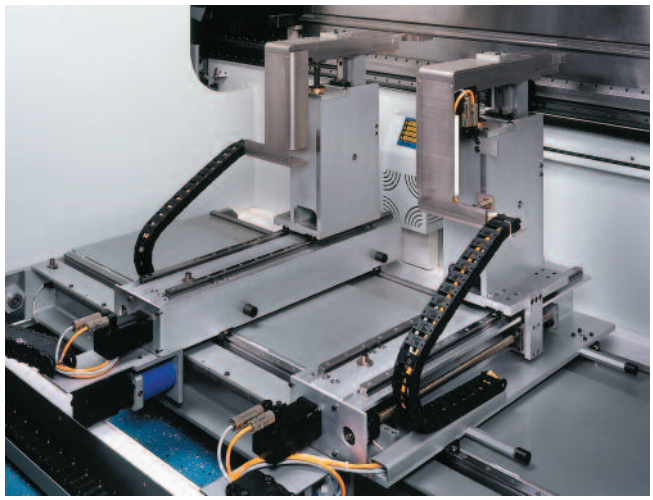
		PPEB-EQ	PPEB-5	PPEB-8	PPEB-EFL	PPEB-H
X-R-Z1-Z2		●				
X-R			●			
X-R-Z1-Z2-X'				●	●	
Modules	X1-X2					❍
	X1R1-X2R2					❍
	X1R1Z1-X2R2Z2			❍	❍	❍

● *Standard*

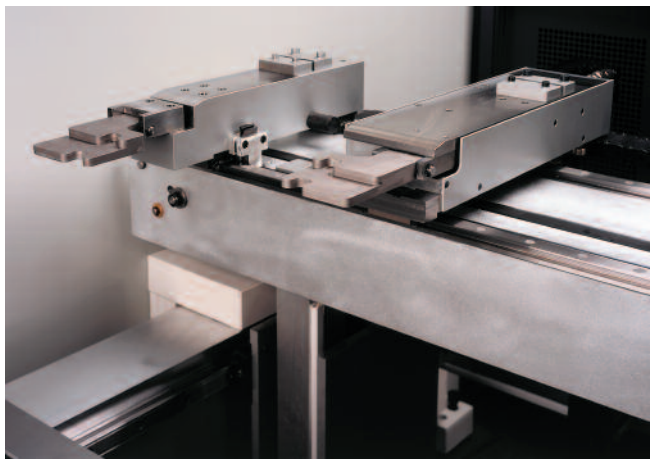
❍ *Optional*

Four-axis backgauge on PPEB-EQ (X-R-Z1-Z2)

Two-axis backgauge (X-R) with pneumatic clamping for finger placement on PPEB-5



Four-axis modular backgauge X1-R1-X2-R2 (PP8211) on PPEB-H Z1 and Z2 also available (PP8251)

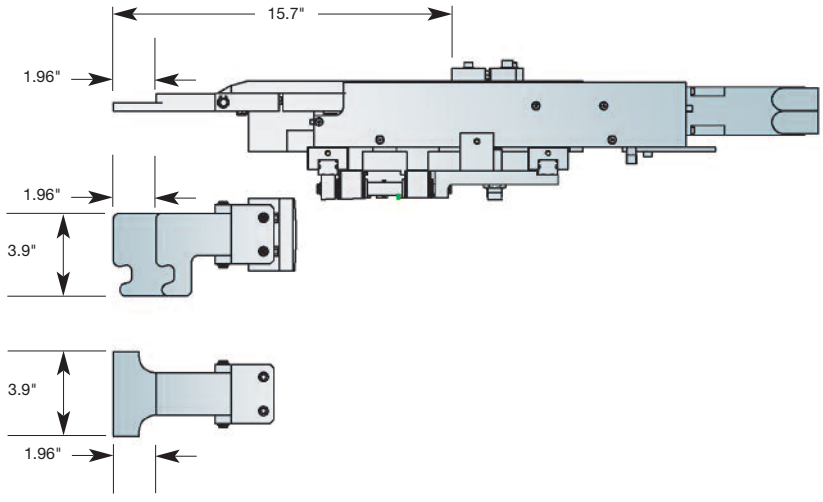


X' with three-point gauge fingers on PPEB-8

Standard PPEB backgauge with three gauge positions allows gauging to 39.3" with material support

Standard eight-axis three-point gauging finger PPEB-8

Standard backgauge finger PPEB-5



CADMAN®-CNC, the latest LVD Strippit press brake control technology:

- Simple, user-friendly control
- High reliability
- Operation of own user applications
- All operation functions via single operating point
- Easy integration to network
- Complete separation between control unit and MMI
- Ergonomic design

Specifications:

MMI (Man Machine Interface)

- Windows®
- Located on a pivoting arm
- 12-inch color flat panel display
- Track ball mouse
- Solid push buttons
- Qwerty keyboard
- Motor start, stop, reset and emergency stop

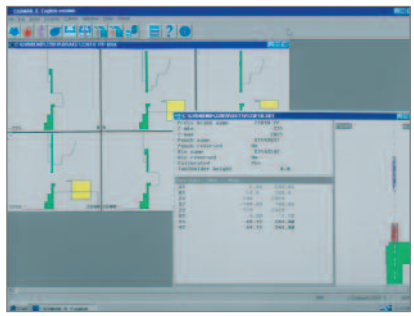
PC RACK

- Located in the electrical cabinet
- CD-ROM disk
- Floppy disk
- Hard disk
- USB port
- PC board
- Real-time board for axis control

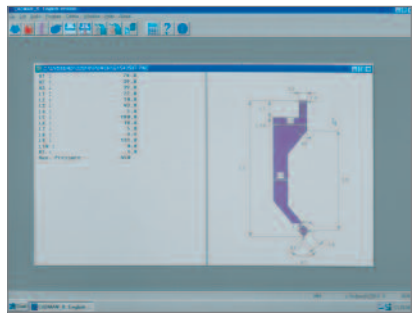
REMOTE CONSOLE

- located in the working area
- Hand wheel for manual axis movement
- Multi-purpose display with 6 softkeys for remote operations
- Two-hands control
- Foot pedal

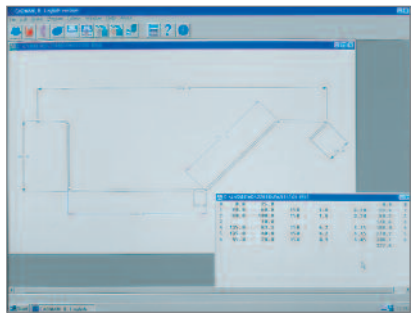
CADMAN®-CNC control with remote console (optional bar code reader)



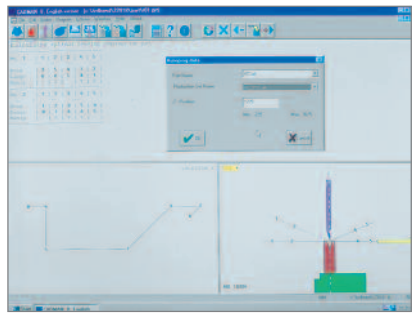
User-definable machine geometry environment



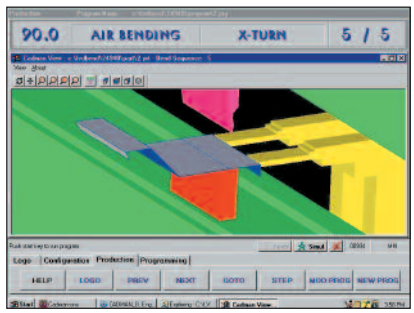
Parametric tool creation



2D part design

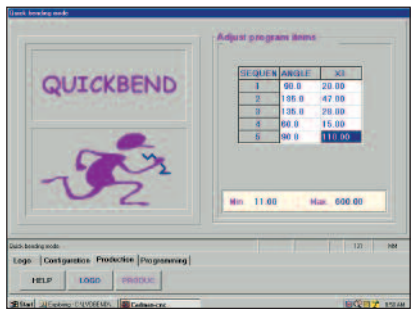


Automatic bending solutions



2D & 3D bending simulation

Programming data



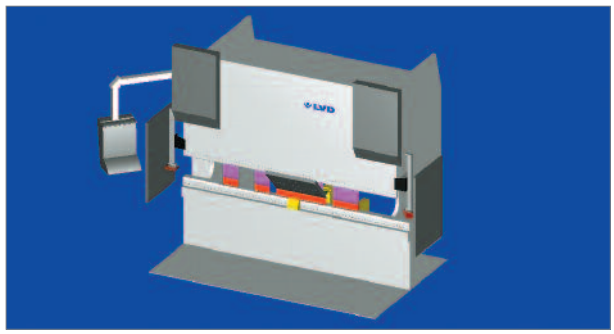
Quickbend

3 points measuring correction

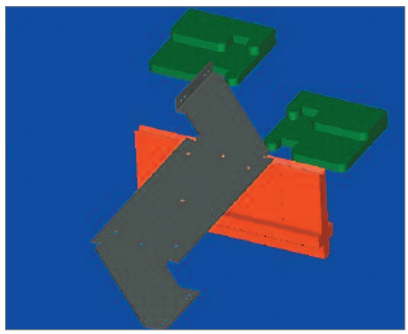
CADMAN software is the ideal solution to prepare offline programs for bending, laser cutting, or punching.

- Parts can be drawn in 2D as well as 3D
- Every surface of the 3D workpiece can be selected as either:
  - a base surface for unfolding
  - to make alterations
- Development has been based on "top down" design methodology:
  - a functional model of the final product is produced first
  - final data, such as material, sheet thickness, connections between the surfaces, are entered
  - the program provides visualization of the solid 3D model
  - the design is developed into a flat blank that forms the basis for the CAM modules
- Can read 2D and 3D DXF files, 3D IGES files and 3D SAT files from external CAD systems
- Can export 2D DXF files of the unfolded part

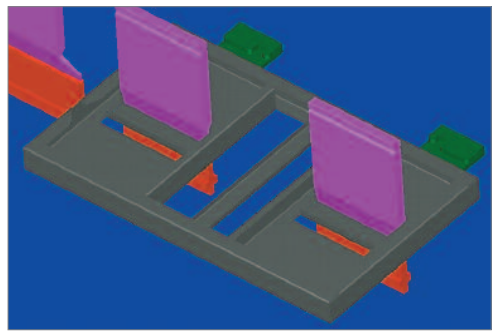
Created with the ACIS® Graphic Kernel from Spatial Technology



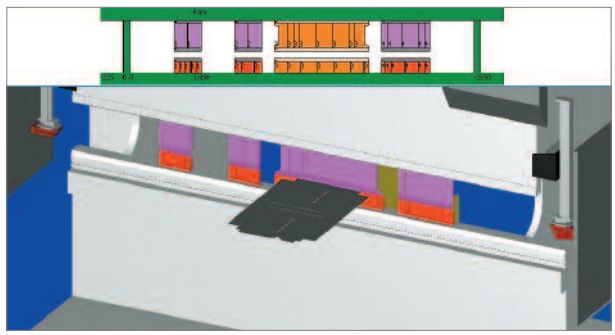
Virtual bending simulation



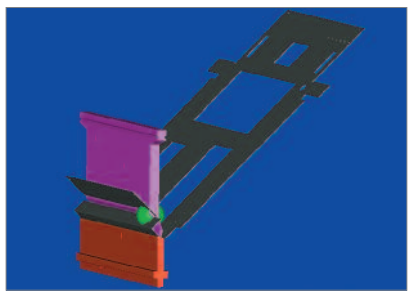
Three-point gauge fingers



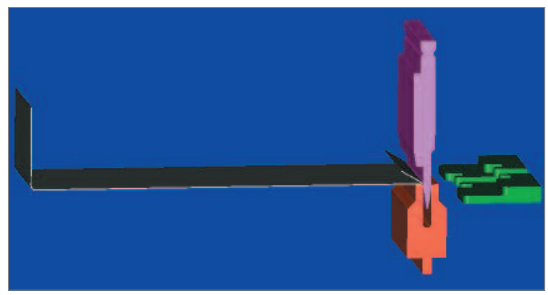
3D solid modeling



3D views for part and tooling



3D simulation viewing with automatic collision detection



3D simulation of hemming bend

Features Designed for Productivity

Quick set-up time

- Various tool clamping systems available
- Quick-acting manual or hydraulic clamping
- Vertical removal or standard style tooling
- Self-seating tooling system
- Precision ground tooling
- Positive tool alignment between punch and die
- Programmable tooling

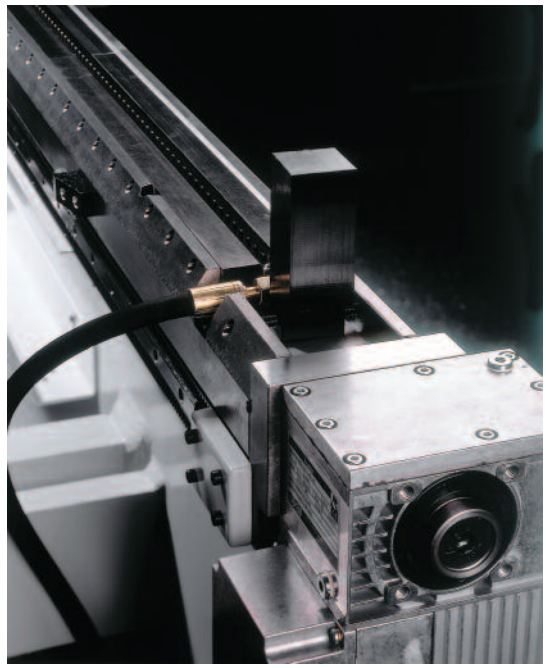


Table with hardened guidings and Wila-A3 clamping

Self-seating hydraulic clamping system

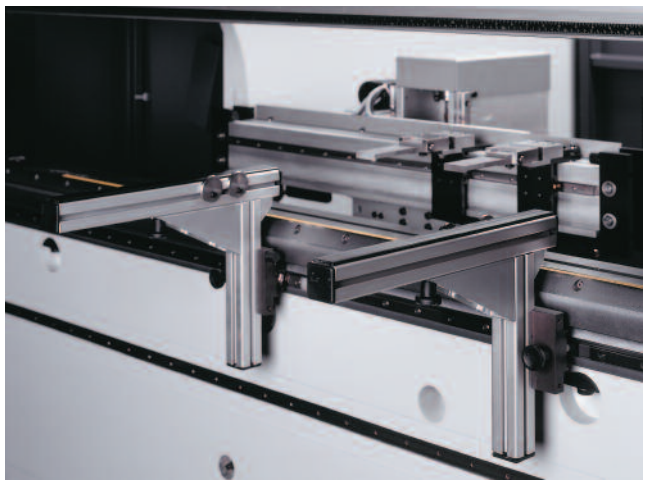
Self-seating manual clamping system

CNC programmable die

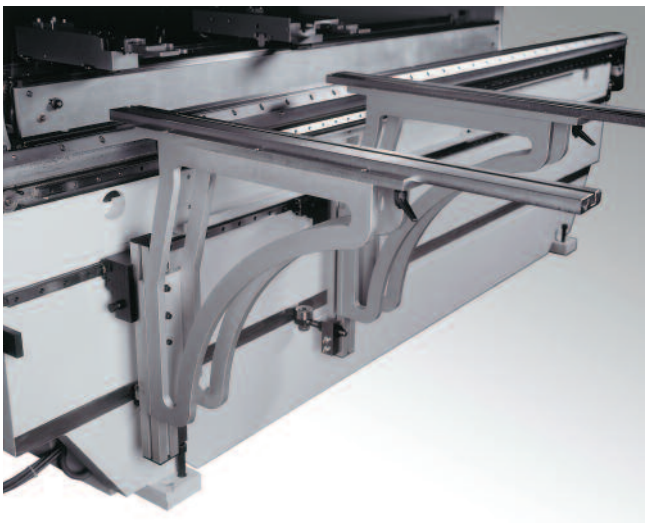
Increased Productivity & Safety

Sheet Support Systems

- One-man operation
- Prevention of back bending
- Angle repeatability
- Improved part quality
- Ease of material handling



PP1020 Front gauge with T-slot (not possible with Easy-Form Laser)



PP1115 Front sheet supports

PP5320 Lazer Safe protection

PP8402 T1, T2 CNC sheet supports with CNC vertical adjustment / Standard duty

Heavy duty

Easy-Form 220/35 and PPEB 220/35 in tandem

Custom-Made Machines

Features

- Increased daylight
- Increased stroke
- Increased throat gap
- Automatic tool changing
- Automated material handling
- Programmable tooling

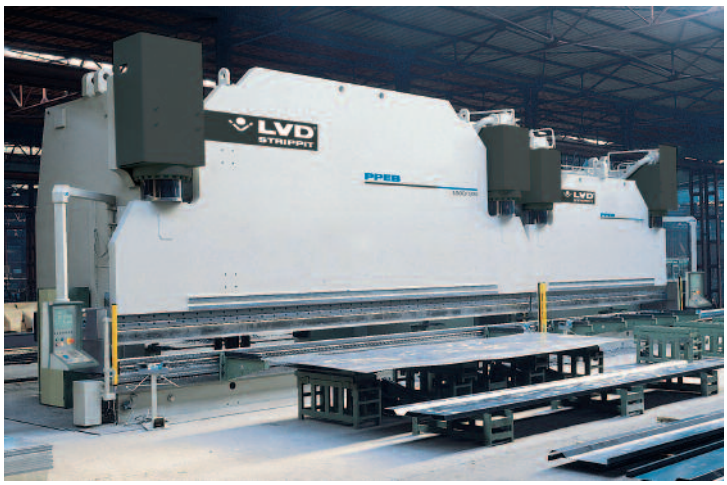
Tandem Operation

- Synchronized operation of two machines with single CNC control
- Independent operation of each machine with separate control
- Dissimilar tonnage and lengths in tandem
- CNC deflection compensation

PPEB 320/30

Special tooling application

PPEB 2000/140



PPEB 1500/100 and PPEB 800/60 in tandem

PPEB 1000/50

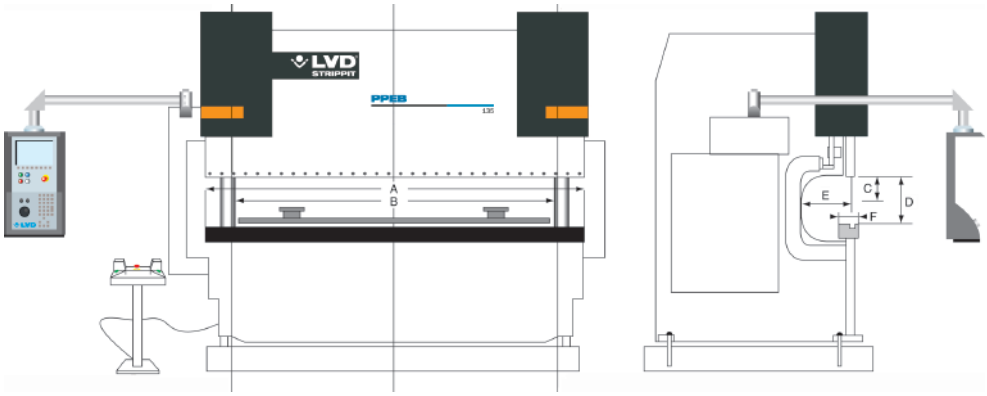
Technical Specifications PPEB

MODEL			80/15	80/20	80/25	80/30	110/30	110/40	110/42	135/30	135/40
Pressing force	ton		90	90	90	90	120	120	120	150	150
Working length	inch	A	59	78	98	120	120	157	168	120	157
Distance between housings	inch	B	41	61	80	102	102	124	150	102	124
Stroke	inch	C	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
Distance table/ram	inch	D	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
Gap	inch	E	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
Table width	inch	F	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
Approach speed	inch/min.		307	307	307	307	307	307	307	307	307
Working speed	inch/min.		28	28	28	28	34	34	34	34	34
Return speed	inch/min.		320	320	320	320	326	326	326	326	326
Motor	HP		12	12	12	12	24	24	24	24	24
Oil	Gal		33	33	33	33	66	66	66	66	66

MODEL			400/40	400/61	500/45	500/61	640/45	640/61	640/80	800/45	800/61
Pressing force	ton		440	440	550	550	700	700	700	880	880
Working length	inch	A	157	240	177	240	177	240	315	177	240
Distance between housings	inch	B	124	198	148	198	148	198	277	148	198
Stroke	inch	C	11.8	11.8	11.8	11.8	12.6	12.6	12.6	15.7	15.7
Distance table/ram	inch	D	22.4	22.4	23.6	23.6	25.2	25.2	25.2	32.3	32.3
Gap	inch	E	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
Table width	inch	F	10.6	10.6	11.8	11.8	11.8	11.8	11.8	15.7	15.7
Approach speed	inch/min.		236	236	236	236	212	212	212	236	236
Working speed	inch/min.		31	31	25	25	25	25	25	28	28
Return speed	inch/min.		340	340	226	226	283	283	283	283	283
Motor	HP		60	60	60	60	90	90	90	2 x 70	2 x 70
Oil	Gal		132	132	185	185	264	264	264	317	317

Specifications subject to change without notice.

Different combinations of stroke and daylight are available in our standard range in increments of 3.9'' (100 mm).
Upon request, other specifications are also available.



135/42	170/30	170/40	170/42	170/50	220/30	220/40	220/42	220/50	220/61	320/30	320/40	320/45	320/61
150	190	190	190	190	240	240	240	240	240	350	350	350	350
168	120	157	168	196	120	157	168	196	240	120	157	177	240
150	102	124	150	179	102	124	150	179	198	102	124	150	198
7.9	7.9	7.9	7.9	7.9	9.8	9.8	9.8	9.8	9.8	11.8	11.8	11.8	11.8
15.7	15.7	15.7	15.7	15.7	19.1	19.1	19.1	19.1	19.1	22.4	22.4	22.4	22.4
15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	7.9	7.9	7.9	7.9
307	236	236	236	236	283	283	283	283	283	283	283	283	283
34	34	34	34	34	56	56	56	56	56	42	42	42	42
326	368	368	368	368	472	472	472	472	472	368	368	368	368
24	35	35	35	35	60	60	60	60	60	60	60	60	60
66	92	92	92	92	92	92	92	92	92	105	105	105	105

800/80	1000/61	1000/80	1000/120	1250/61	1250/80	1250/120	1500/80	1500/120	1800/80	1800/120	200/140	3000/150
880	1100	1100	1100	1400	1400	1400	1650	1650	2000	2000	2200	3300
315	240	318	472	240	318	472	315	472	315	472	551	590
277	198	277	356	198	277	356	258	356	258	356	490	472
15.7	15.7	15.7	15.7	15.7	15.7	15.7	23.6	23.6	31.5	31.5	35.4	31.5
32.3	32.3	32.3	32.3	32.3	32.3	32.3	39.4	39.4	49.2	49.2	63.0	78.8
15.7	15.7	15.7	15.7	19.7	19.7	19.7	23.6	23.6	23.6	23.6	49.2	33.5
15.7	15.7	15.7	15.7	15.7	15.7	15.7	19.7	19.7	19.7	19.7	31.5	35.4
236	189	189	189	189	189	189	142	142	142	142	182	165
28	25	25	25	20	20	20	20	20	17	17	25	17
283	255	255	255	240	240	240	204	204	162	162	240	156
2 x 70	2 x 70	2 x 70	2 x 70	2 x 70	2 x 70	2 x 70	2 x 80	2 x 80	2 x 80	2 x 80	2 x 120	2 x 120
317	396	396	396	396	396	396	476	476	476	476	792	925

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