Smart-binder ‘PLUS HS’ Product Guide

Revision 34 *(23 May 2021)*

Smart-binder Systems

Models SB-1, 2 or 3

for saddle-bound books

Model SB- 4 or SB-5

for both saddle-bound and perfect bound books

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Document Revision History

Rev	Date	Description of main changes made at each release
33	March 2021	Complete update and rewrite
34	May 2021	New appendices for wire stitch heads 52/8-2 and 43/6-S and a new section for 'wire stitching specs'

Product specifications and / or appearance are subject to change without notice.

Preface

IBIS Integrated Bindery Systems Ltd, is specifically not liable for any damage or injury arising from the information contained in this document, or failure to exercise due care in the installation, operation, and servicing of any IBIS supplied equipment.

Spare Parts and Service:

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For **Customer Service and Spare Parts enquiries in North America,** please contact: Gary Martin, Service Manager at Best Graphics Service or Mike Keller, Parts Manager at Best Graphics Parts Department. You can call Best Graphics at 262.522.3330 or email service@bestgraphics.net or parts@bestgraphics.net. Best Graphics is located at W222 N600 Cheaney Drive, Waukesha, WI 53186

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1 Introduction to the Smart-binder product range

The **'Smart-binder'** system from UK manufacturer '**IBIS Integrated Bindery Systems'** processes digitally printed sheets into either stitched or glue-bound booklets, or books.

The **Smart-binder** is an evolution of IBIS's first in-line connected DST2 saddle-stitcher, which was released to the market at Drupa 2000. The Smart-binder replaced the DST2 at Drupa 2004 with many enhancements over its predecessor including **easier operation** and optional **glue binding**. The latest high-speed model Smart-binder **'PLUS HS'** has a **66% increase in performance** over earlier models and new electrical controls and drives. The Smart-binder system now leads the way as the system of choice for use in-line with digital printers (or near-line/off-line).

The Smart-binder model SB-2 produces conventional wire-stitched booklets only. Models SB-3, 4 and 5 offer wire stitching and IBIS's unique, patented sheet-gluing process called **Individual Sheet Gluing (ISG):** both on the same machine. Models 4 and 5 also include a perfect binding for production of hot-glue books, in addition to saddle-bound booklets.

When making ISG cold glued booklets the bar-coded sheets arrive at speeds up to **180 meters/min** and are individually plow folded. A line of cold glue dots is applied precisely on the fold line and the sheets are then collected and pressed together, before being 3-knife trimmed. ISG cold glue binding provides many benefits over conventional wire stitching for booklets up10mm (3/8") thick. The cost of the cold glue is similar to wire staples, but advantages include **book lay-flat quality, ease of recycling, better page pull strength** and the ability to **vary book thickness on-the-run** from minimum to maximum without needing to make stitch-head adjustments.

The sheet sequence within each booklet is controlled by reading a bar code (or 2D code) on each sheet and any incorrectly assembled booklets are automatically rejected, ensuring **100% correct booklet integrity.**

The extended model Smart-binder SB-XW offers an increased booklet spine length of 457mm and an increased booklet width of 273mm. It can produce **A5 portrait books in 2-up mode**, using the optional trimmer centre-knife.

The lower speed **Smart-binder model SB-1** is available for use in-line with cut-sheet printers or for lower production volume requirements. **Smart-binder models SB-4 and SB-5** include also in-line perfect binding with the option of a single clamp or 5-clamp binder.

All Smart-binders may be used **in-line** with a digital printer or fed **near-line** from a pre-printed roll or **off-line** from a sheet pile feeder.

2 IBIS Product Range Summary

1/ Saddle-binding (wire-stitching or saddle cold-glue binding). In-line, near line or off-line operation. ***Note: this table does <u>not</u> include the SB-1 which is a lower speed/lower cost Smart-binder for use in-line with cut-sheet printers or for low production volumes.***

	Model	Max Input Speed	Max Output speed	Binding method (s)	Max book thickness	Cover or insert sheet feeding	Key Features
Saddle-stitching only	***Smart-binder SB-2 'PLUS HS'***	Up to 400 sheets/ min *(off-line)* Up to 130meters/ min web speed Up to 180meters/ min web speed *(with extra buckle-folder)*	**7,000 booklets/ hour** (1-up) **14,000 booklets /hour** (2-up using optional trimmer center-knife).	**<u>Saddle stitching</u>** Wire stitching only (Can be upgraded to include also perfect binding: SB-4 or SB-5, see next page)	10 mm (0.39")	Low pile feeder *(reload on the run)*. More than one feeder may be supplied (cover feeder and insert feeder or two cover feeders) Covers use same folder as sheets.	• Very heavy-duty and high performance. • Individual Sheet and booklet tracking for personalised output •On the run variation in book thickness •Suitable for long production runs/24/7 operation. •Maximum flexibility. •Adaptable for special applications. • Simple and easy-to-use.
Saddle-stitching + saddle gluing (ISG)	***Smart-binder SB-3 'PLUS HS'***			**<u>Saddle-binding</u>** Wire-stitching <u>and</u> ISG cold glue binding (Can be upgraded to include also perfect binding: SB-4 or SB-5, see next page)			*Additional features:* Includes IBIS's patented cold-glue binding process (ISG) <u>in addition to</u> conventional saddle-stitching).

Note 1: The lower performance, lower cost Smart-binder **model 'SB-1'** is available for use in-line with cut sheet printers (max input sheet rate: A3=100 sheets/min A4 = 200 sheets/min).
Note 2: Smart-binder **model 'SB-X'** increases maximum untrimmed booklet spine length to 457mm (18") to allow 2-up 5 ½ x 8 ½" (or A5) <u>portrait</u> booklet production.
Note 3: Smart-binder **model 'SB-W'** increases the maximum untrimmed booklet width to 273mm (10 ¾").

2/ Perfect binding (hot-glue binding)

	Model	Max Throughput speed	Number of clamps	Binding method (s)	Max book thickness	Cover feeding	Key Features
Perfect Binding only	***Sprint- binder PB-600B***	400 books /hour	1	**Perfect binding only** *Hot-melt glue (or optional PUR)*	60mm	Integrated cover feeder Feeds covers from top of pile (stop to reload) Up to 6 coverscores	Auto-setting Off-line hand feeding position. Optional in-line book trimmer EVA or PUR glue
	Sprint- binder PB-1500W	1500 books /hour	5		70mm	Integrated cover feeder Feeds covers from bottom pile (continuous feed) Up to 4 coverscores	

Note 1: The perfect binders listed above may also be combined with the Smart-binder SB-1, 2 or 3 to form the Smart-binder SB-4 or SB-5 systems. The SB-4 and SB-5 can produce both saddle-bound and perfect bound books.

Note 2: See separate Product Guide for Sprint-binder Perfect binders

3 Glossary of terms used in this Product Guide

Bar-code: A series of small black lines printed close together and used to communicate coded numerical data. Bar-codes read by the Smart-binder system enable it to identify sheets and/or signatures and also carry out automated functions under bar-code control.

Bed knife: The lower knife blade which does not move during the shear cutting process.

Buckle fold: When a sheet is folded by stopping the leading edge of the sheet so that the center part of the sheet passes through a pair of pressure rollers. The resulting fold is perpendicular to the direction of sheet travel through the folder.

Buffer: a device which can accept sheets at one speed, store them and deliver them at a different speed.

Bump turn: The act of changing the direction of a sheet by stopping it and then moving it in a direction which is90-degrees to its original direction.

CF Printing: Printing on a 'Continuous Forms' web (as opposed to cut-sheet printing)

Clincher: A device which bends a wire stitch (staple) closed, after it has been pushed through several sheets. Clinching is required to complete the stitching process.

Cold glue: PVA (poly vinyl acetate) glue which contains a high proportion of water and becomes hard when this water is lost (evaporates).

Continuous forms (CF): a method of printing using a paper web fed from a roll

Cover: The outside sheet of a book

Creasing: The act of pressing something with a V-edge against a sheet of paper,toto assist subsequent sheet folding.

Creep: This describes the way that images move gradually further away from the front edge of a finished (trimmed) book, the further the sheet is from the center sheet. This is due to the need for the outer sheets on a saddle-bound book to 'wrap around' the inner sheets.

CSP: IBIS Customer support package.

Datamatrix: A 2-D code (normally a square box with dots inside it) used to print on sheets to provide data about that sheet and the booklet to which the sheet will be added.

Digital printing: A printing process in which each printed image can be computer controlled using 'digital signals' to be different to the next printed image.

DFA/DFD: Communication protocols used to allow finishing devices to communicate with cut-sheet digital printers (Canon and Xerox).

EVA glue: normal 'hot melt' glue used to make perfect bound books (see also 'PUR')

Finishing: The conversion of sheets into booklets or books.

Foot: The bottom edge of a finished book or booklet (perpendicular to the spine)

Fore-edge (front edge): The edge of a book which is opposite to the bound edge

Gsm: Grams per square metre (paper stock weight)

Head: The top edge of a finished book or booklet (perpendicular to the spine)

Hole drilling: The act of making a small hole in a sheet through using a rotary drill

Hole punching: The process of making a small hole in a sheet or a booklet by using a circular 'punch' (through pressure only, no rotation).

Hot Melt glue: EVA glue which becomes liquid when heated and hardens when cooled (see also 'PUR').

ID number: personalised book identity number (a unique number for each different book).

Impositioning: The arrangement of printed pages on both sides of a sheet or a webtoto give a desired end result of correct page sequence after the sheets are bound together.

Ink Jet printing: A method of printing by applying dots of liquid ink to paper

In-line finishing: A book or booklet finishing machine which is directly connected to a digital printer.

Insert sheets: Sheets which are fed from a different source to the other sheets in a book and inserted in between these other sheets.

Inserting: Either the addition of an extra sheet inside a book, or the placement of a finished book inside an envelope

Integrity: Refers to the page sequence inside a finishing book being correct (the 'integrity' of the book relates to it having the correct print content and page sequence, which may be unique to that book)

ISG: Individual sheet gluing (a IBIS-patented process of applying cold glue dots to the inside of the sheet fold. This process is unique to the IBIS Smart-binder)

Knife fold: When a sheet is folded by a blade pushing the center of the sheet between a pair of pressure rollers.

Landscape format: A book bind orientation in which the bound edge is along the shorter dimension of the page (the American word for this is "oblong').

Loop stitching: A wire staple which has a loop in it allowing a booklet to be placed into a 'ring binder'

Near Line: When a book finishing machine is not directly connected to a digital printer but is close to a printer (usually a finishing system fed from a pre-printed roll using a roll unwinder).

Oblong *(US)*: A book bind orientation in which the bound edge is along the shorter dimension of the page (see also 'Landscape').

Omega Stitching: See 'loop stitching'.

Off-line: When a book finishing machine is not directly connected to a digital printer.

Page: One printed image (each page in a finished book has a different page number)

Perfect Binding: The process of collecting several sheets or signatures (sigs) together side by side, clamping these sheets/sigs together, applying hot-glue to the edges of the sheets/sigs and then pressing a cover sheet over the top of the hot glue to bind the sheets and cover together. The resulting book spine has90-degree 'square' edges (sometimes called 'square backed').

Perforations (Perfs): A row of small holes in a sheet which allow a sheet to be manually torn easily along the line of perforation holes.

Plough fold (*U.S: Plow fold*): A fold which is parallel to the direction of movement of the sheet and in which the sheet direction is not changed during the fold process.

Portrait format: A book bind orientation in which the bound edge is along the longer dimension of the page (the opposite of 'Landscape' or 'Oblong').

pp: Pages (as in '8pp' means a sheet with 8 pages printed on it).

Printed Sheet: One single unfolded sheet of paper, comprising several pages printed on each side.

PUR: Polyurethane Reactive glue which is liquid when hot and reacts with the water in the air to solidify as it cools after being applied to the book spine (an alternative to EVA 'hot melt' glue)

Rotator: a device which 'rotates' sheets by90-degrees

Saddle-stitching: The process of collecting folded sheets astride an inverted 'V' shaped saddle and then stitching these sheets together while the apex of the saddle ensures all sheets are correctly registered. The resulting book spine has a V shape.

Saddle-binding: The process of collecting folded sheets astride an inverted 'V' shaped saddle and then binding these sheets together using either wire staples or ISG cold glue, while the apex of the saddle ensures all sheets are correctly registered. The resulting book spine has a V shape.

Scoring: The act of rolling a V-edged wheel against a sheet of paper,toto assist subsequent sheet folding.

SCF: Sheet (or signature) collector and feeder. The SCF is used to collect sheets together on top of each other and feed these into the clamps of the BB3002 perfect binder.

Self-cover booklet: a booklet in which the outside sheet is processed identically to the other sheets within the booklet

Sheet: An unfolded sheet of paper, normally containing printed images (pages) on both sides

Shear knife: A dual opposing knife system whereby one knife blade moves past the other knife blade.

Side edges: The two edges of a book which are perpendicular to the bound edge

Side Glue: The thin line of glue that is applied to each side of the book spine, so that the cover glues to the side of the book and not just to the spine.

Signature (sig): A printed sheet which has been folded once or several times. When using the Smart-binder SB-4 then a signature may also apply to several sheets which have been folded onto a saddle and glued together (typically 16 – 28 pages in a signature).

SM(P): Scheduled machine Maintenance (Program)**:** Machine maintenance, which is scheduled in advance, paid for in advance and occurs at pre-decided dates.

Spine: The bound edge of a finished booklet or book.

Spine squaring: When the V spine of a saddle-stitched booklet is compressedto have square edges (to look more like a perfect bound book)

Spool: A coiled reel of wire using to feed wire stitching heads

Square back: This description applies the spine of a perfect bound book. See also ‘spine squaring’ above

Staple: See ‘Stitch’.

Static charge: This refers to the static electrical charge which may be found on the surface of a non-conductive material (such as a sheet of paper). ‘Anti-static’ systems may be used to apply an equal and opposite static charge to the paper to neutralise the static charge.

Stitch (otherwise referred to as a ‘Staple’): A small length of metal wire which passes through several sheets and is then bent back on itselfto attach these sheets together.

Stitching head: A device which pulls continuous wire from a spool, cuts a small length of this wire, bends this small length into an inverted U shape and presses this U-shaped piece of wire through a number of sheets (after which the ends of the wire are bent again by clinchers to bind the sheets together)

Three-knife trim: A knife trim (cut) operation in which a small amount is trimmed off all three (non-bound) edges of a book

Thread sewing: The use of ‘thread’ to attach signatures together, prior to further binding processes (normally associated with ‘hard cover’ or ‘case’ binding).

Toner: plastic ‘dust’ heated onto the paper by ‘toner printers’

Trolley: A devices with wheels capable of storing a pile of sheets and moving these easily around the factory

Web printing: Printing on a continuous ‘web’ of paper coming from a paper roll.

4 Smart-binder Saddle-stitcher regulatory certifications

4.1 Compliance with Safety Regulations:

IBIS Integrated Bindery Systems Ltd, 9 The Gateway Center, Coronation Road, Cressex Business Park, High Wycombe, Bucks, HP12 3SU, UK hereby state that the machine listed below:

Product: Smart-binder

Model: SB1, SB2, SB3

Complies with the following:

4.2 Legislation

The Supply of Machinery (Safety) UK Regulations 2008 as amended 2011 (2004/108/EC).

The Electrical Equipment Directive (2006/95/EC)

The Electromagnetic Compatibility UK Regulations 2006. (2004/108/EC).

4.3 Standards

EN60204-1:2006, A1 2009

EN61000-6-4:2007, A1 2011

EN61000-6-2:2005

FCC Part 15 Subpart B Class A (USA) C108.8 Class A (Canada).

5 Summary of Smart-binder user-features and benefits

1) A True 24/7 Production System

With over **180 systems installed world-wide**, the Smart-binder has repeatedly proven itself to be a true 24/7 reliable, heavy-duty production system and is the most commonly used finishing system for high-speed digital web printers. Many SB systems run continuously in 3-shift operation over many years and produce millions of booklets every month. No other digital saddle-stitcher has a comparable record of accomplishment.

2) Integrated Sheet and Book Tracking

The Smart-binder was designed from the start to incorporate sophisticated **data tracking** for personalized booklets. The Smart-binder's integrated system of sensors and software permits 100% accurate tracking of each sheet and booklet (competitive systems use 3rd-party tracking systems). Incomplete booklets are automatically rejected. Separately fed covers may be checked to ensure matching with inside sheets.

A detailed log file is created as the machine runs from which individual booklet data can be extracted. This is critical in production environments where each document must be tracked and accounted for.

3) Second-to-none Book Finish Quality

The Smart-binder processes and **folds each sheet individually** (instead of in batches as with competitive systems) which ensures optimum possible book fold quality and lay-flat even when making books up to10mm (3/8”) thick. The Smart-binder trimmer **cuts all three edges** for an optimum finish and a unique, patented device minimizes book corner tearing when trimming maximum thickness.

The Smart-binders SB-4 and SB-5 includes either the in-line PB-600 or PB-1500 **hot-melt perfect binder** for high quality thick books with square spines. The perfect binders include 3-roller gluing, side gluing and multiple coverscores: all for highest possible book quality.

4) Bind-on-demand for personalization or short job runs

Because the Smart-binder was designed to finishing digitally printed sheets, it incorporates the unique ability to **vary book thickness on-the -run** without any adjustment needed. The trimmer uses gravity-registration to allow it to process books with a constantly changing thickness. In combination with integrated sheet and book tracking this makes the Smart-binder a true bind-on-demand system.

5) Different Configurations and Finishing Methods:

The Smart-binder offers the greatest variety of possible **system configurations**. Select from five different models (SB1, 2, 3, 4 or 5) to provide saddle-stitched books, cold-glue bound books (with optional spine-squaring), combined cold and hot glue-perfect-bound books up to 60mm (2 3/8”) thick, or hot-glue perfect-bound books up to 70mm (2 3/4”) thick.

Every Smart-binder system may be configured to operate either in-line with the printer, near line from a roll unwinder/sheeter or off-line from a sheet pile feeder. It is also possible to configure an

SB system to operate both in-line and off-line with quick changeover between the two operating modes.

6) High Production Speeds:

The Smart-binder 'Plus HS' cycles at up to **7,000 cycles/hour**. It can accept sheets at a rate of **450 sheets/min** and handle printer and unwinder web speeds up to **180meters/min (595.5 ft/min).**

7) Unique, patented, 'ISG' cold-glue binding:

Smart-binder models SB-3, SB-4 and SB-5 include IBIS unique **ISG cold glue binding option** (which applies a line of cold glue dots to the fold on each sheet). Saddle-bound booklets produced with ISG cold glue, instead of wire staples, have higher page-pull strength, better fold quality (lay-flat) and are easier to recycle compared with equivalent wire-stitched booklets. The ISG glue consumable cost is like wire staples. Quick changeover is available between stitching and gluing. The ISG cold-glue nozzle is reliable and easy to use: no operator adjustment needed. Glue is applied to the surface of the sheet, not the edge.

When using the SB-4 to make 'perfect bound' books then sheets are ISG cold-glued into signatures before they enter the binder clamp. This produces a book which resembles a thread-sewn book but is made using a combination of ISG cold glue and hot-melt glue. Advantages of this unique binding process include:

- Easier and more reliable to feed pre-glued signatures into the binder clamp instead of a pile of individual loose sheets.
- Hot-melt glue is applied to the outside fold of the ISG-glued 'signatures', not the individual sheet edges (removes the need for sensitive operator adjustments and removes the risk of individual sheets coming lose due to poor binding).
- No spine preparation, milling or roughing needed and therefore no noise or dust created.

8) Cover-To-Text Matching:

The Smart-binder's integrated software provides the option for personalized cover to-book text matching, using barcode scanners mounted on the cover feeder and sheet infeed register table.

2-up A5 landscape

The 'stretched' model Smart-binder SB-XW can produce 2-up **A5 portrait booklets** at up to 10,000 booklets/hour.

9) Sheet buffer for in-line connection to the printer

The optional sheet buffer module SBS-100 is available for in-line connected Smart-binders to enable the Smart-binder to run at a **different speed from the printer** for short periods, or to stop without immediately stopping the printer.

10)Customization:

The Smart-binder can be customized for a large **variety of applications**. We have connected with envelope inserters, stackers, folders, in-line booklet drills, knife folders, amongst many other options. Additional modules can be added directly to the Smart-binder, including sheet pile feeders, cover and insert feeders, in-line cover gate-folding, pile loading trolleys, trimmer center-knife, card and reply envelope tipping, dynamic sheet perforation (see below), hole punching and much more.

IBIS specialize in creating **customized systems** to meet each individual customer's needs. This may require adapting and interfacing modules from other vendors and/or designing unique equipment solutions. We have many hundreds of man-years experience in putting together 'tailored' finishing systems.

11) Ease of use and maintenance:

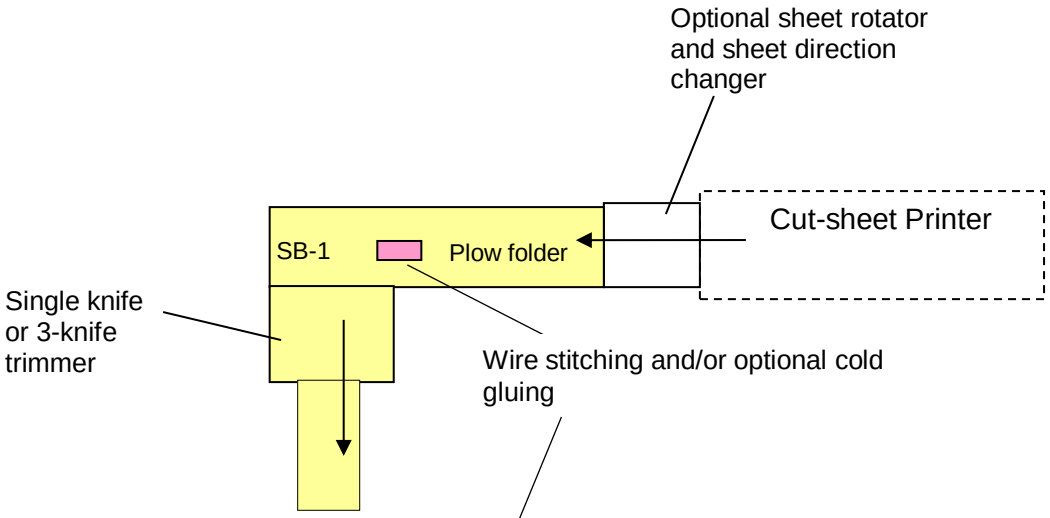
The machine is **easy to operate**, has good access and visibility of the paper path, and is easy and economical to maintain.

6 Different model Smart-binders

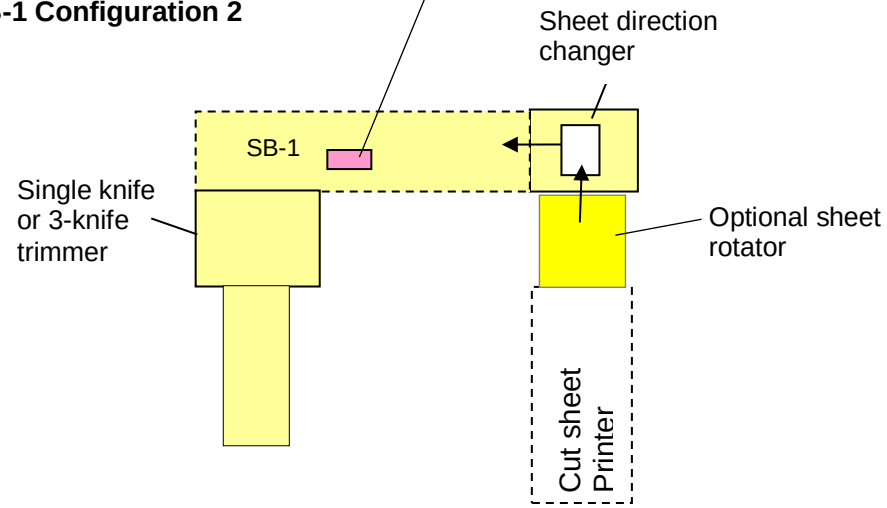
Using the “fold-bind-trim” process, the Smart-binder (SB) produces either wire-stitched (saddle-stitched) booklets or cold-glued booklets up to a maximum of10mm (3/8”) (3/8”) thick. The optional addition of a ‘perfect binder’ (hot glue binding) PB-600 or PB-1500 allows glued books to be produced up to a maximum of 70mm (2 3/4”) thick.
The Smart-binder may be fed either from a high-speed digital web printer, or a pre-printed paper reel, or a high-speed sheet feeder (or a combination of these options). Printed sheets must enter the SB in correct sequence (i.e., digitally printed or offset-litho printed and then pre-collated).
Various model Smart-binders are available (each upgradeable from the preceding model):

6.1 Smart-binder SB-1 (low-speed applications only in-line with cut-sheet digital printers)

- **SB-1 Configuration 1**



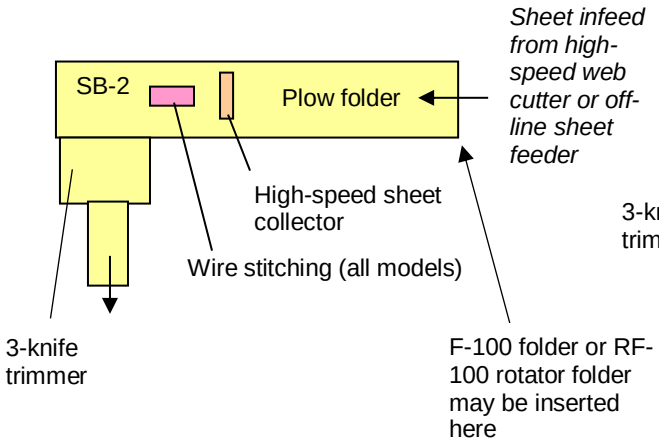
- **SB-1 Configuration 2**



6.2 Smart-binder SB-2, SB-3 (and stretched model SB-XW) for high-speed applications

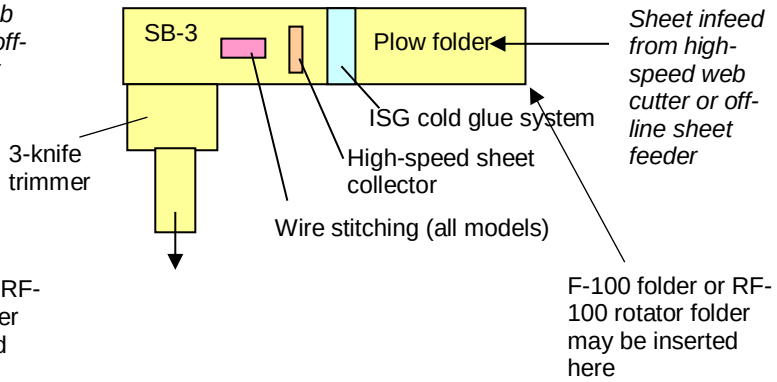
Smart-binder SB-2

Saddle-stitched booklets only.



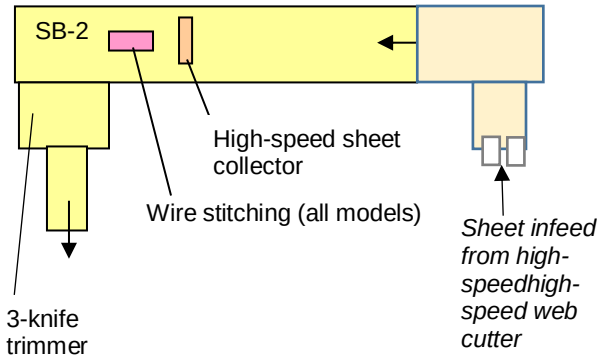
Smart-binder SB-3

Saddle-stitched and ISG cold-glued booklets.



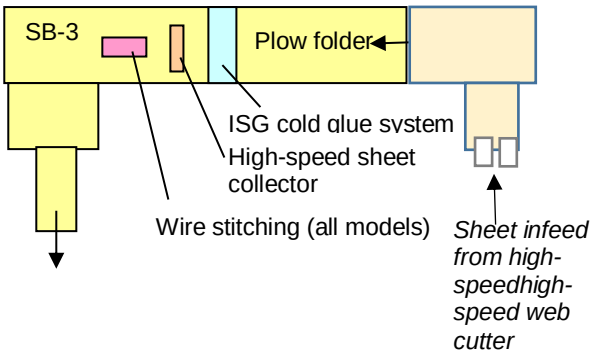
Smart-binder SB-2
(with sheet direction change TUSDC)

Saddle-stitched booklets only.



Smart-binder SB-3
(with sheet direction change TUSDC)

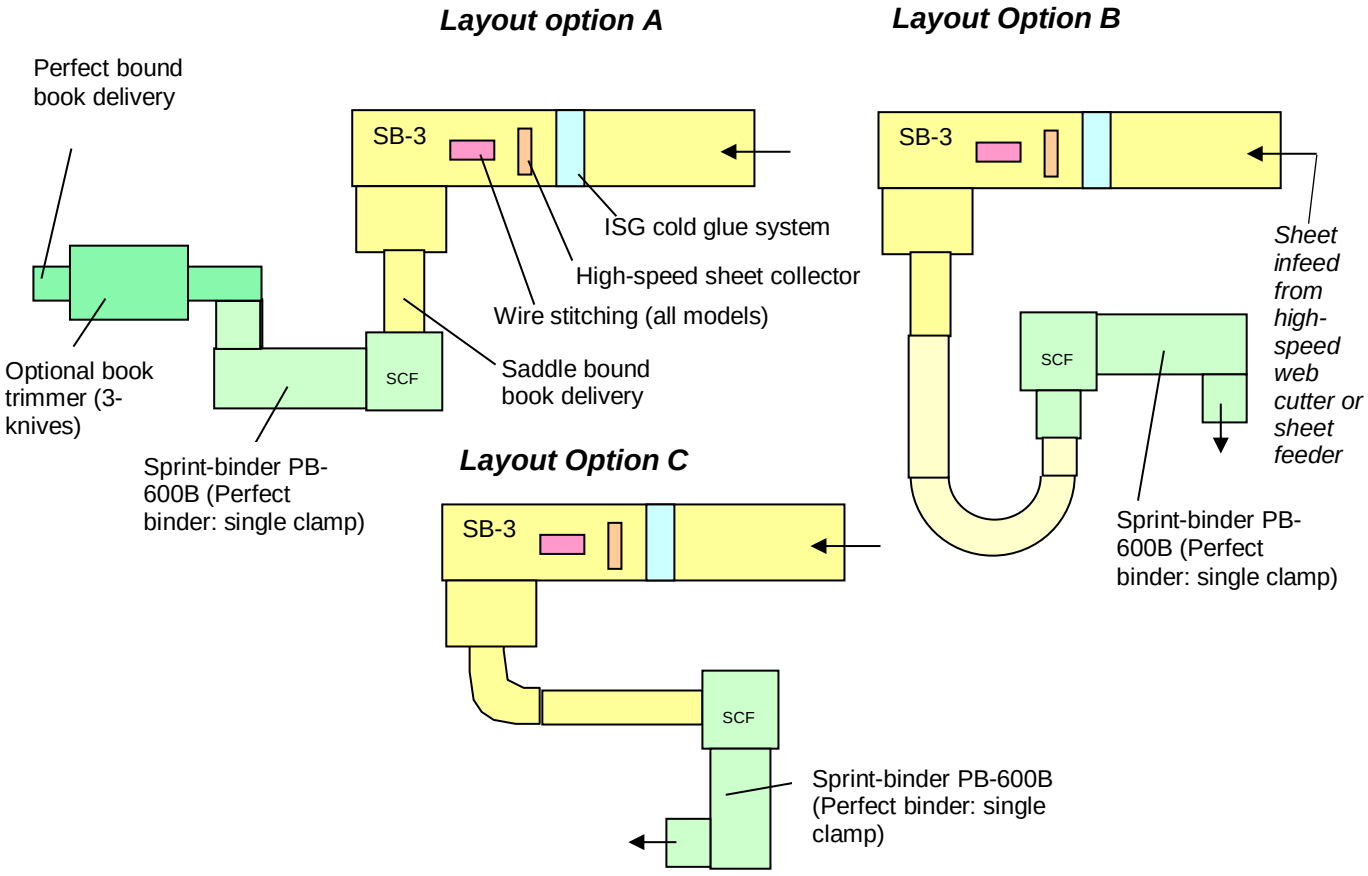
Saddle-stitched and ISG cold-glued booklets.



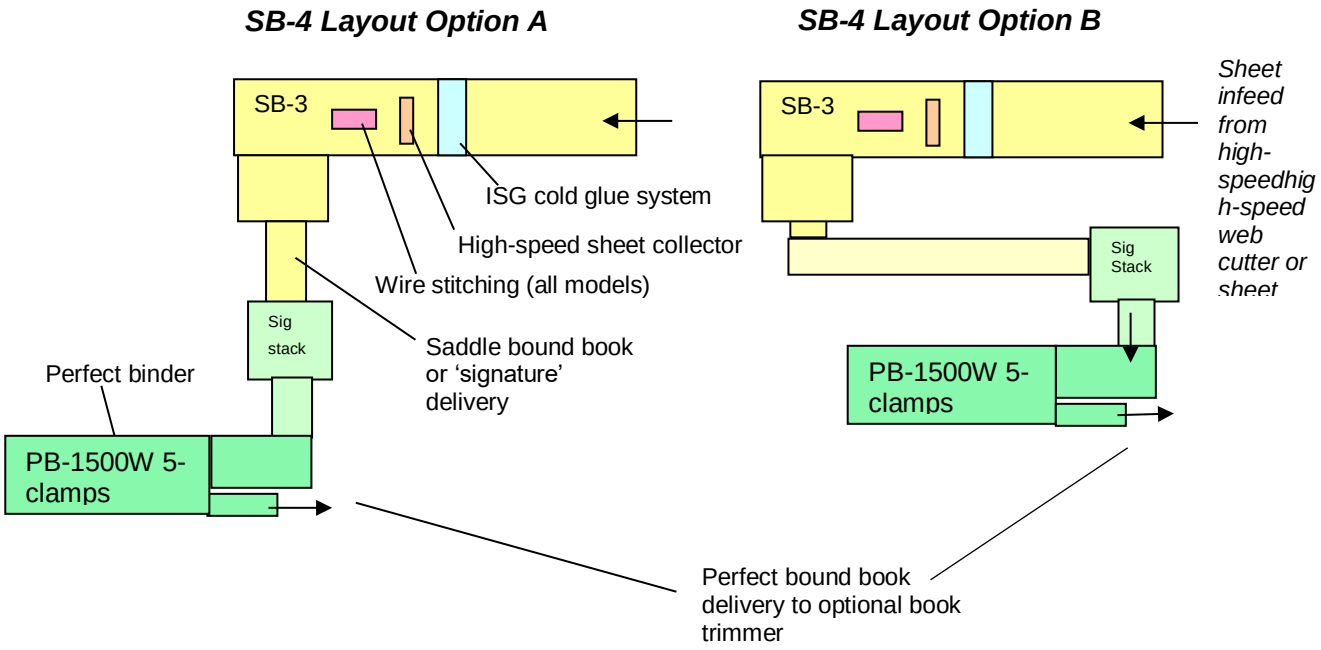
Note: The Smart-binder models SB-2XW and SB-3XW are 'stretched' machines, identical to the standard SB-2 or SB-3, but capable of producing larger format booklets

6.3 Smart-binder SB-4

Smart-binder SB-4/600 (SB-3 with single-clamp perfect binder): Saddle-stitched books, ISG cold-glued books and 'perfect bound' books with combined cold and hot glue binding.

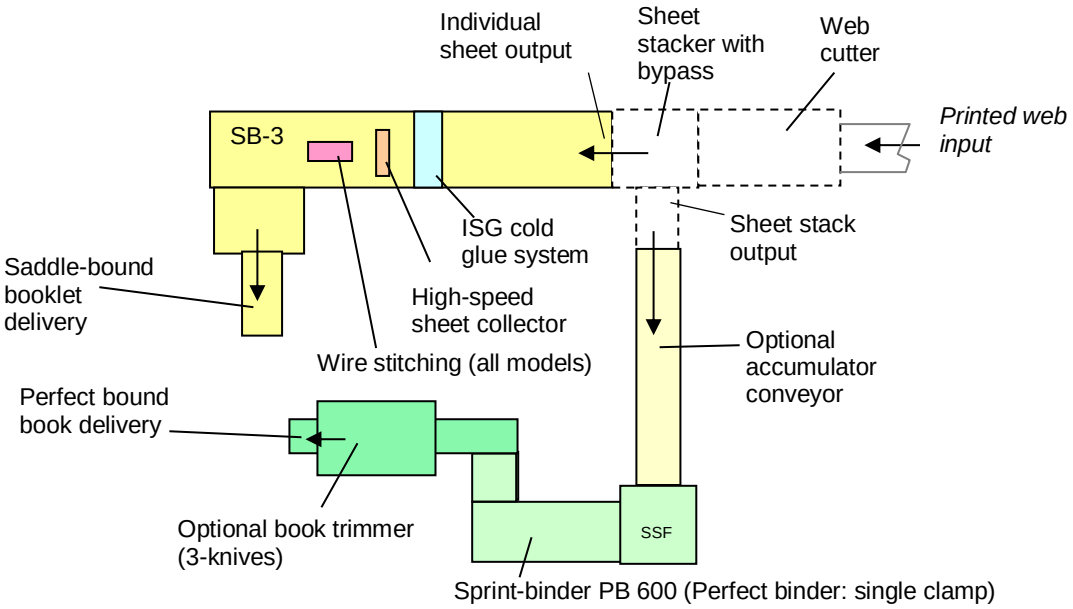


- **Smart-binder SB-4 with 5-clamp perfect binder:** Saddle-stitched books, ISG cold-glued books and 'perfect bound' books with combined cold and hot glue binding.

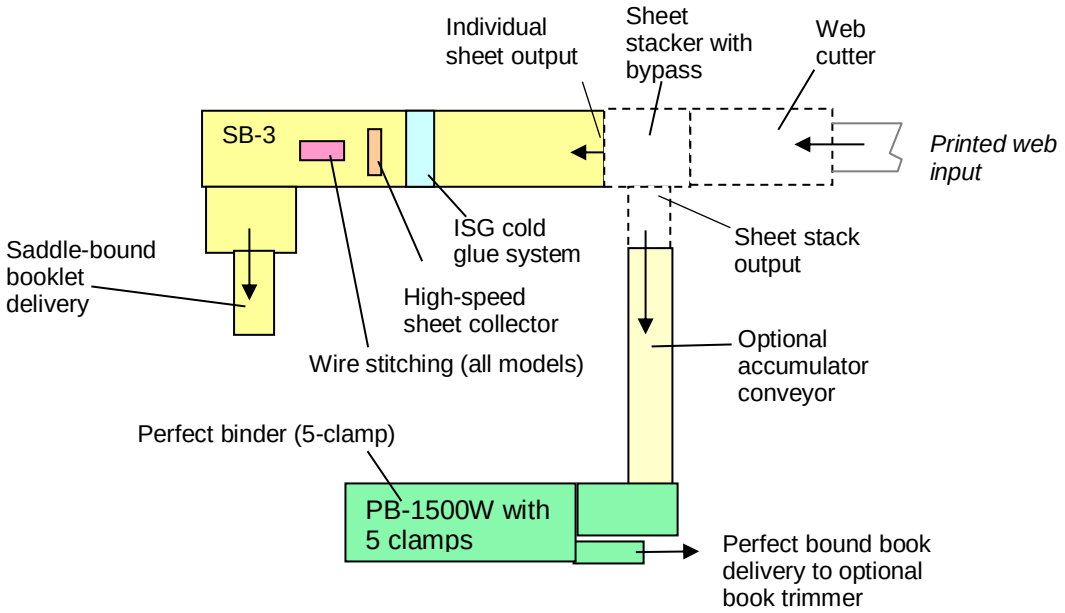


6.4 Smart-binder SB-5

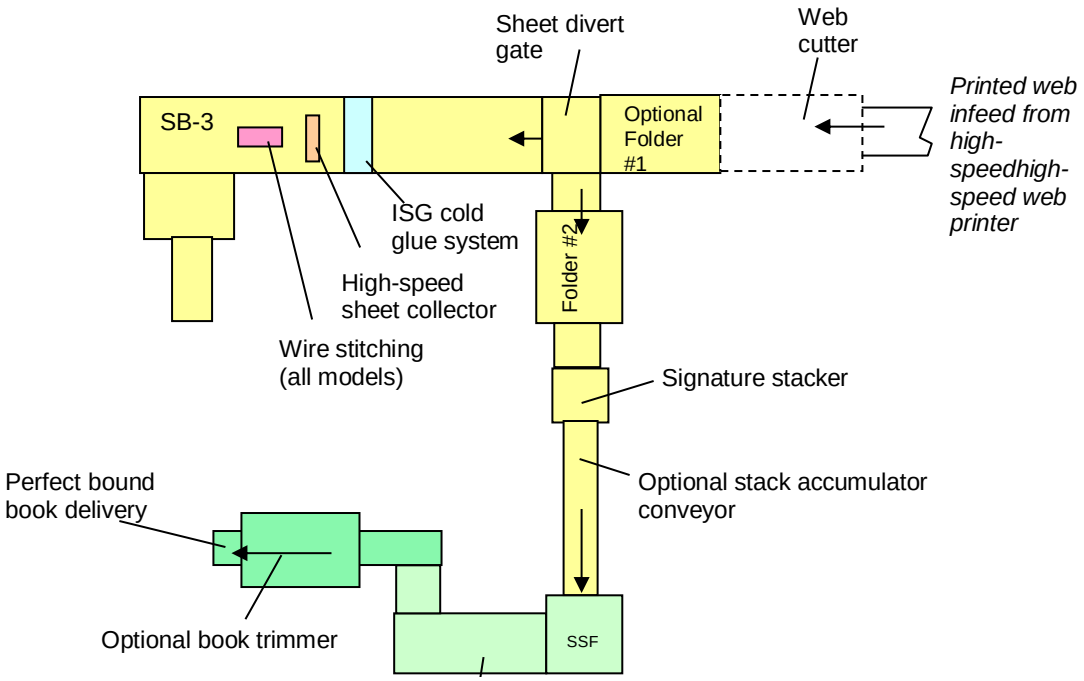
- **Smart-binder SB-5 with single-clamp perfect binder**: Saddle-stitched books, ISG cold-glued books and perfect bound books.



- **Smart-binder SB-5 with 5-clamp perfect binder)**: Saddle-stitched books, ISG cold-glued books and thick perfect bound books.

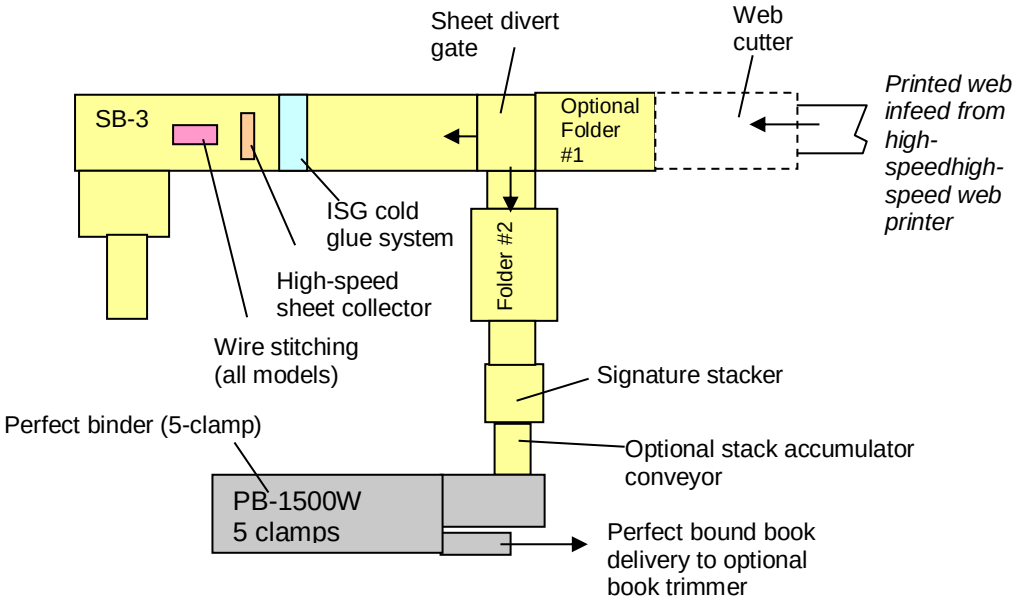


Smart-binder SB-5 with single-clamp perfect binder (using two buckle-folders): Saddle-stitched books, ISG cold-glued books and perfect bound books.

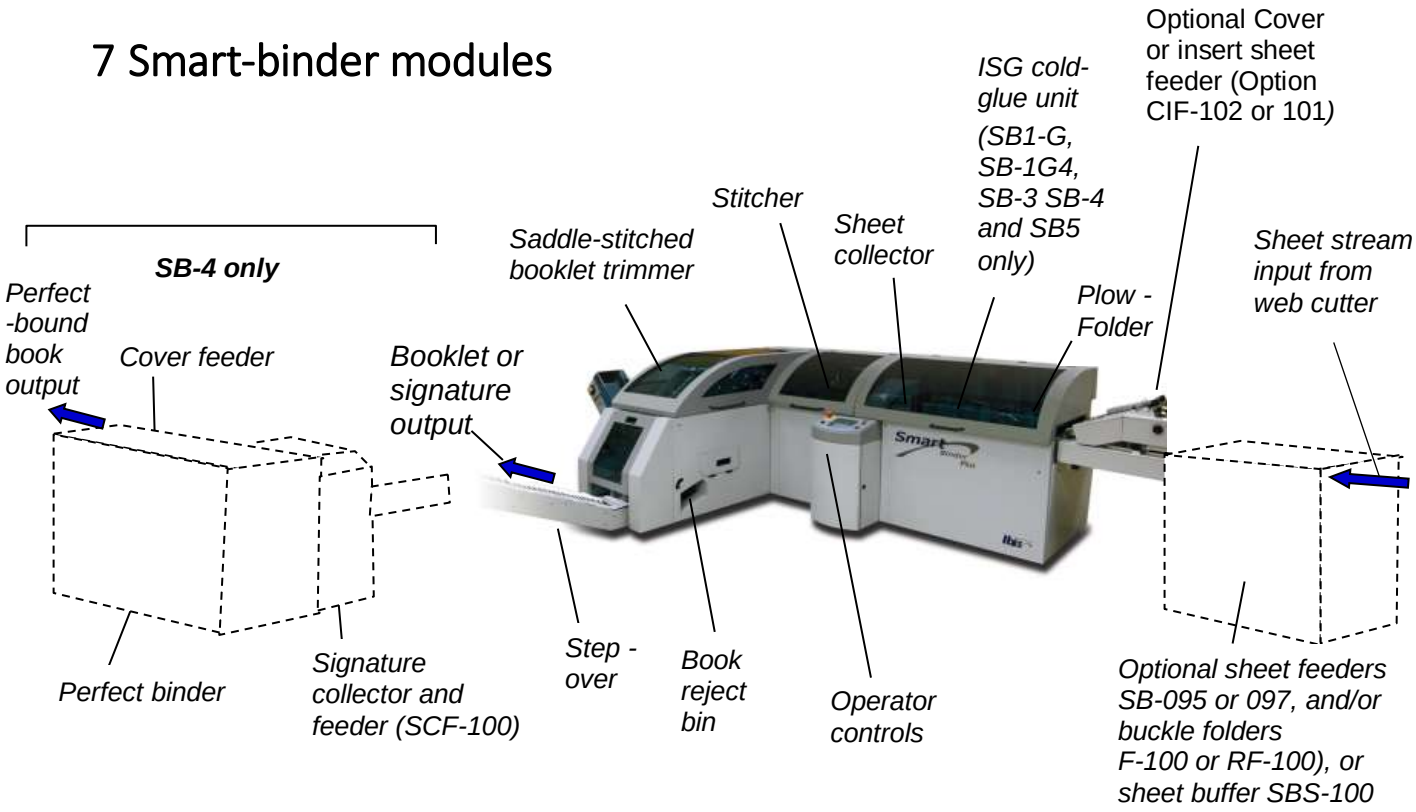


Sprint-binder PB 600 (Perfect binder: single clamp)

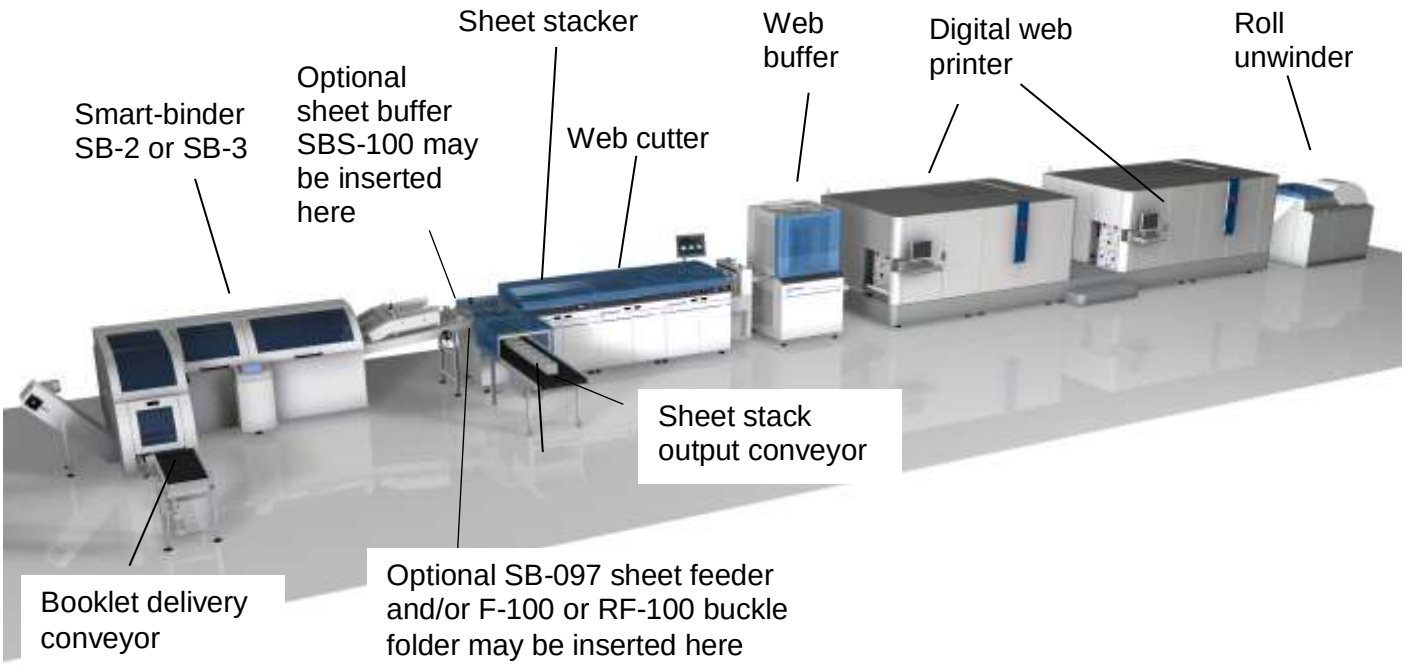
Smart-binder SB-5 with 5-clamp perfect binder (using two buckle-folders): Saddle-stitched books, ISG cold-glued books and perfect bound books.



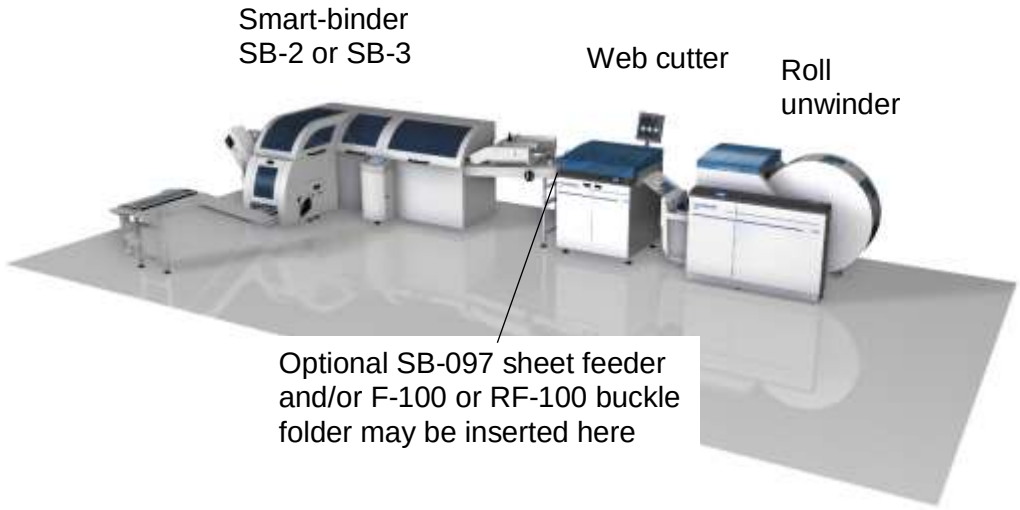
7 Smart-binder modules



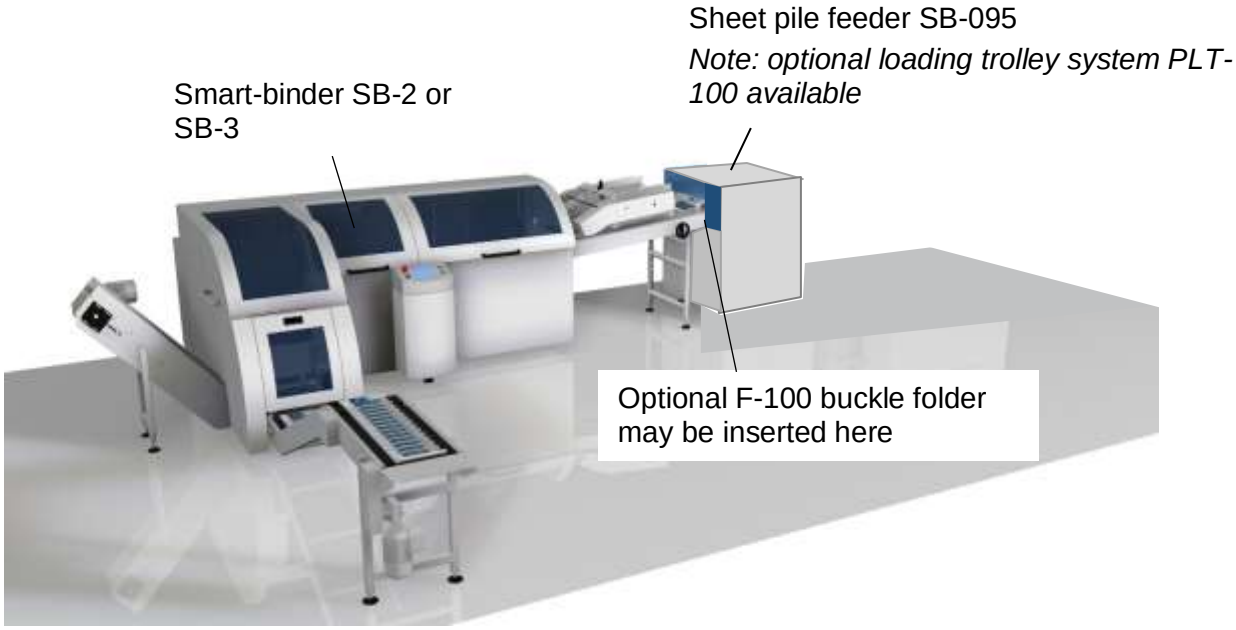
7.1 Smart-binder SB-2, SB-3, or SB-X in-line with a digital web printer



7.2 Smart-binder SB-2, SB-3 or SB-XW near-line with a web cutter and roll-unwinder



7.3 Smart-binder SB-2, SB-3, or SB-XW off-line with a high-speed sheet pile feeder

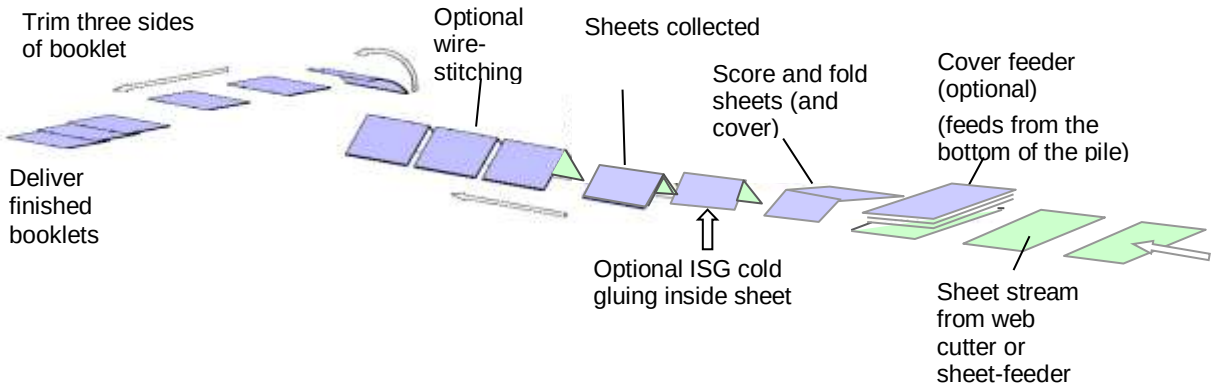


8 Smart-binder binding processes and sheet flow

8.1 Producing saddle-bound booklets up to10mm (3/8”) (3/8”) thick

8.1.1 Sheet flow

The Smart-binder can be installed directly in line with a web cutter (and CF printer) running at web speeds up to 130meters/min (426 feet/min). Alternatively, by adding an extra in-line buckle folder (F-100, F-101 or F-200) this web speed may be increased to 180-200 meters/min (595 - 656 feet/min). Alternatively, the Smart-binder may be fed from a sheet pile feeder at up to around 400 sheets per minute.



Note: View animated sheet flows on our website:
Smart-binder SB-2 animated sheet flow
Smart-binder SB-3 animated sheet flow

8.1.2 Accurate high-quality folding.

Each sheet inside the book is folded individually and collected with the book cover to produce wire-stapled or cold-glued booklets. Individual sheet folding results in a flatter book compared with folding multiple sheets together in sets.

8.1.3 Wire stitched booklets

After the sheets and cover are collected together, they pass into the stitching module. Wire stitches are formed from continuous wire spool using stitching ‘heads.’ Up to six stitching heads can be used to give up to six stitches per book. Loop stitches may be applied (instead of normal ‘flat’ stitches) to produce booklets to fit into standard ring binders.

After stitching the books are three-knife trimmed to finished size. Individual sheet folding, stitching on the saddle, and three-side trimming produces the highest possible quality stitched booklets.

An optional additional post-trimmer ‘spine squaring’ system (SM-100 or ARSD-S) is available if required to compress the V-shape spine into more a square shape.

8.1.4 ISG cold-glued booklets – SB-1G, SB1-G4, SB-3, SB-4, and SB-5 only

The unique IBIS-patented ISG (Individual Sheet Gluing) system applies a carefully controlled line of cold glue 'dots' accurately on the inside fold line of each sheet, and the outside cover, before the sheets are collected, pressed together and three-side trimmed. See Appendix 1 for further details.

8.1.4.1 Advantages of the ISG process over conventional wire stitching:

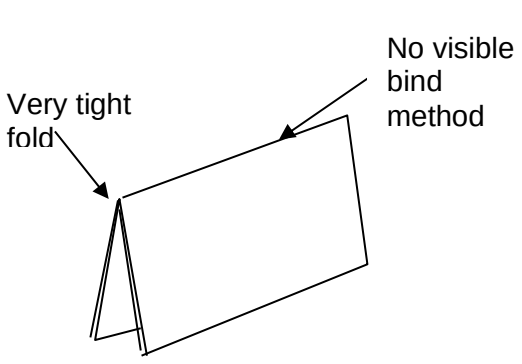
- Higher page-pull strength on the outer and inner sheets
- Tighter fold, particularly on thicker books. This is because wire stitching tends to 'open up' the book fold. A tight fold is particularly important when inserting documents into envelopes
- Cold-glued books can be recycled more easily than books containing wire staples.
- Glue binding avoids any child safety issues relating to the edges of wire staples.
- Glued books can sometimes be mailed directly, unlike wire-stapled books.
- The ISG gluing process requires no adjustment when the book format or thickness changes.
- The ISG glue application nozzle system has a much lower maintenance cost compared with wire stitch heads which comprise hundreds of small components.

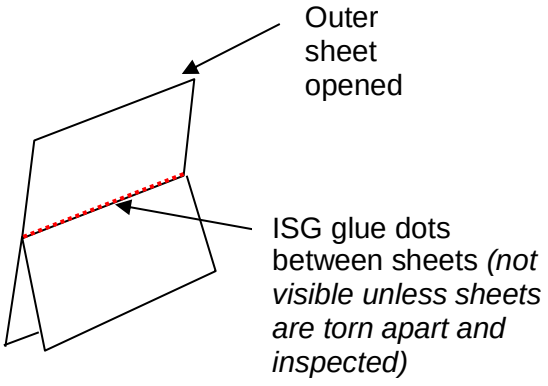
Note that bond strength when using ISG gluing is linked to the paper porosity and integrity of the paper surface. Higher strength results from more absorbent papers. Certain inks/toners may weaken the bond strength if applied to the same area as the ISG glue (the sheet fold).

Note: a continuous glue dot optical-detection system stops the Smart-binder immediately if glue stops being applied to the sheets. This prevents the production of any un-bound booklets.

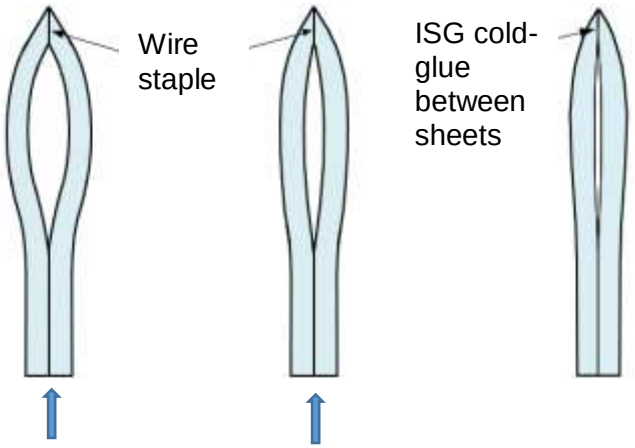
8.1.4.2 ISG- Glued booklets

See Appendix 1





Thick-book cross-section comparisons: Wire-stitching vs. ISG cold-gluing



3) Using individual sheet folding prior to ISG cold-gluing ***(Smart-binders SB-1G, SB1-G4, SB-3, SB-4, and SB-5)***

1) Using stitch/fold/trim process ***(conventional booklet-maker)***

2) Using individual sheet folding prior to wire stitching ***(All Smart-binders)***

8.1.4.3 Quality comparison between wire stitching and ISG cold-gluing

This booklet was made on the SB-3 using ISG cold-glued (showing improved lay-flat)

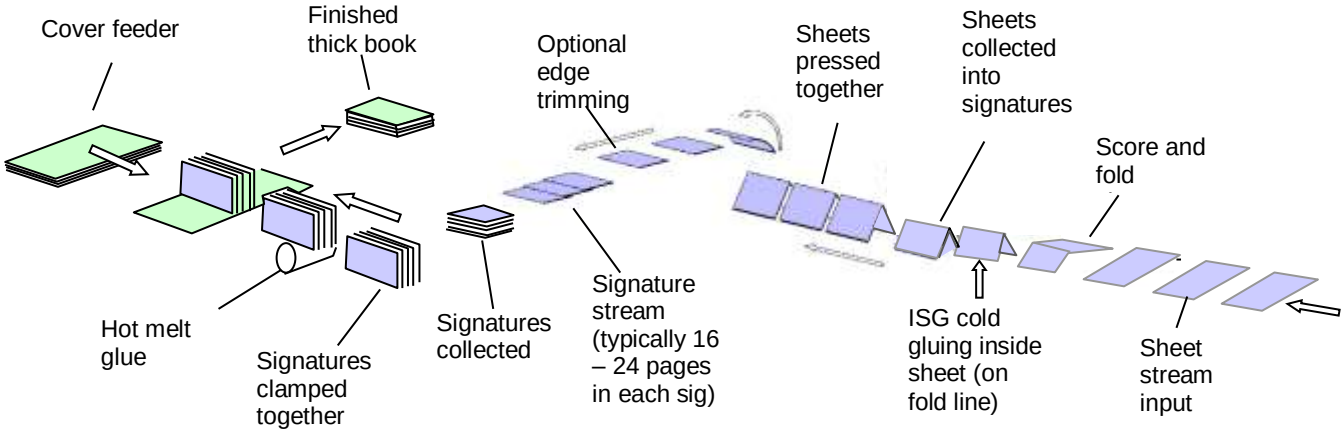
This booklet was made on the SB-3 using conventional wire-stitching

8.1.4.4 Consumable cost comparison between wire stitching and ISG cold-gluing

See ‘Consumables’ section

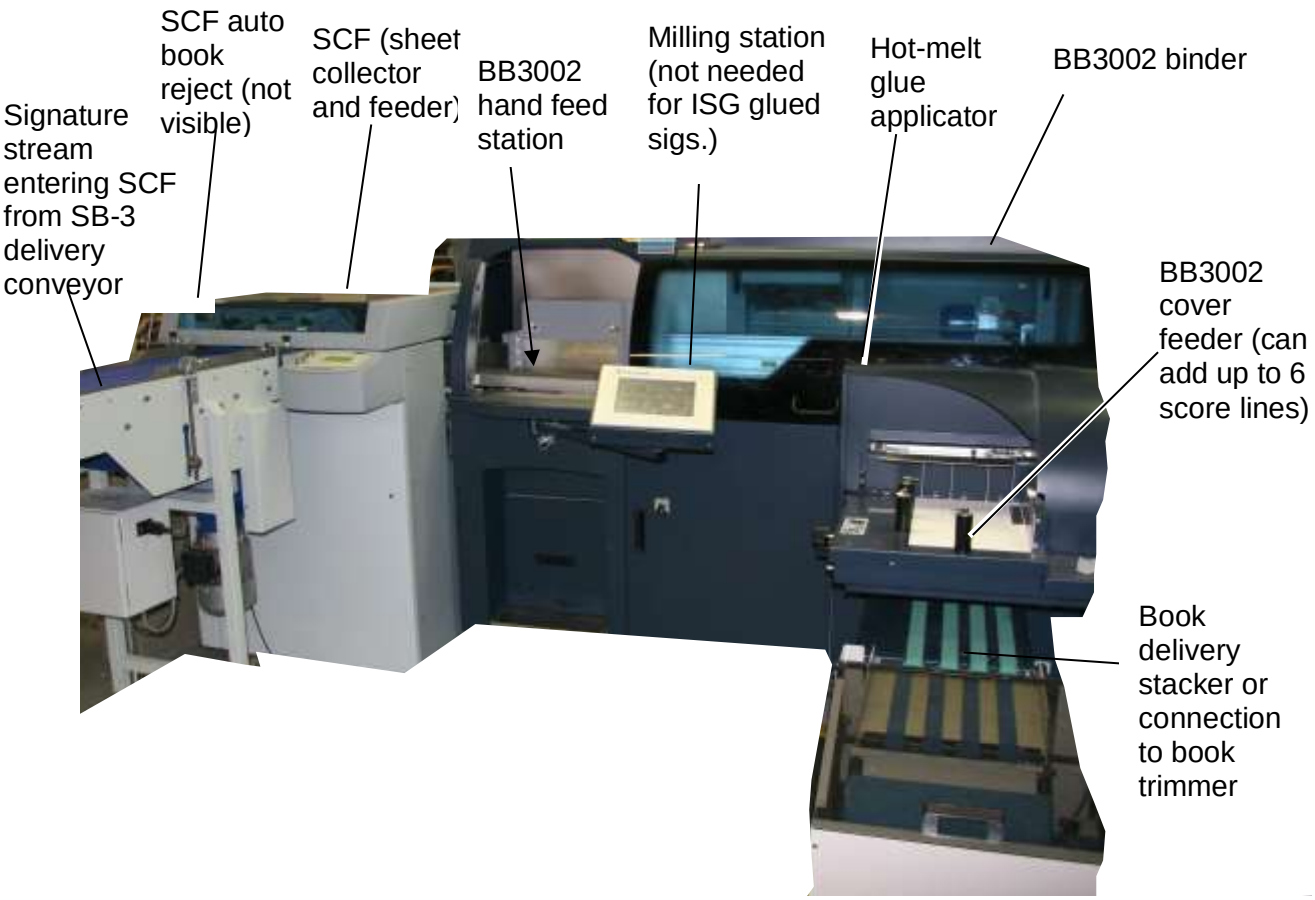
Note: In general, ISG cold glue is a similar consumable cost to wire staples when making thin to medium thickness booklets.

8.2 Producing perfect bound books 5-60 mm thick (1/8-2 3/8”) using the SB-4.

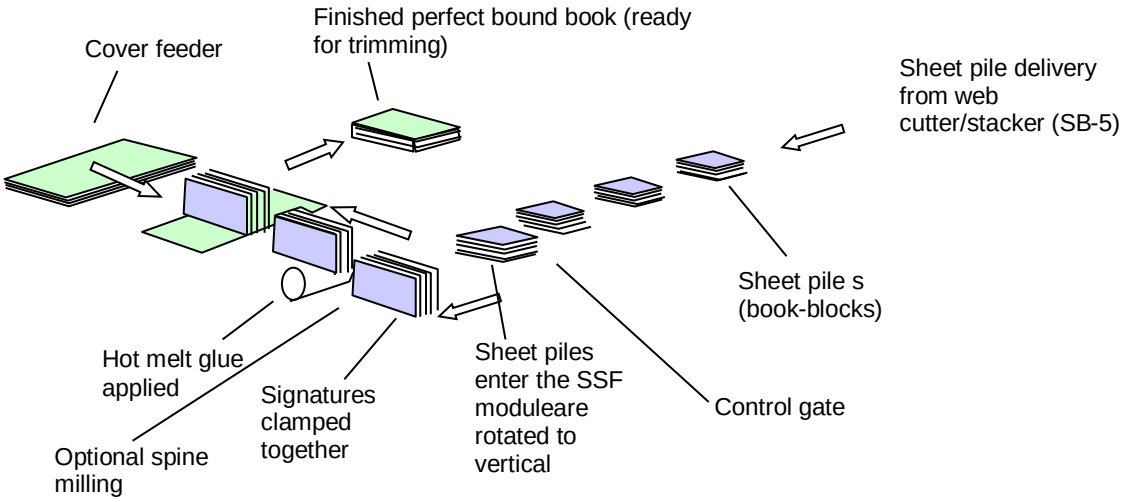


The SB-4 produces thick ‘perfect bound’ books by producing ISG glued sections (‘signatures’) containing typically between 16 and 24 pages. These tightly-folded and cold-glued signatures are then collected together into the clamp of the in-line perfect binder (1-clamp or 5-clamp) where a layer of hot-melt glue (or PUR) is applied to the outside of the signature folds and a scored book cover is pressed tightly around the spine. The perfect-binder adjusts itself automatically to suit incoming book thickness to make the system truly bind-on-demand.

8.2.1 One-clamp perfect binder PB-600B and SCF as used with the Smart-binder model SB-4



8.2.2 Producing perfect bound books 5-60 mm thick (1/8”-23/8”) using the SB-5



The SB-5 produces ‘perfect bound’ books by receiving piles of sheets directly from the web cutter, accumulating these piles and feeding them into the clamp of the in-line Perfect Binder. The binder ‘mills’ the edges of the sheets and applies a layer of hot-melt glue. The book cover is then scored and pressed tightly around the spine. The binder adjusts itself automatically to suit incoming book thickness to make the system truly bind-on-demand.

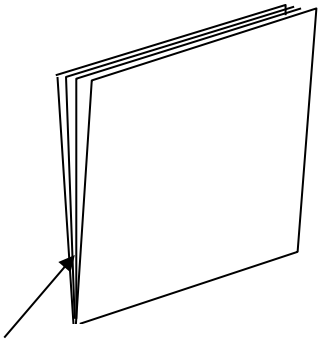
8.2.3 Single-clamp PB-600B perfect binder as may be used on the SB-5

8.2.4 5-clamp PB1500W perfect binder as may be used on the Smart-binder SB-5

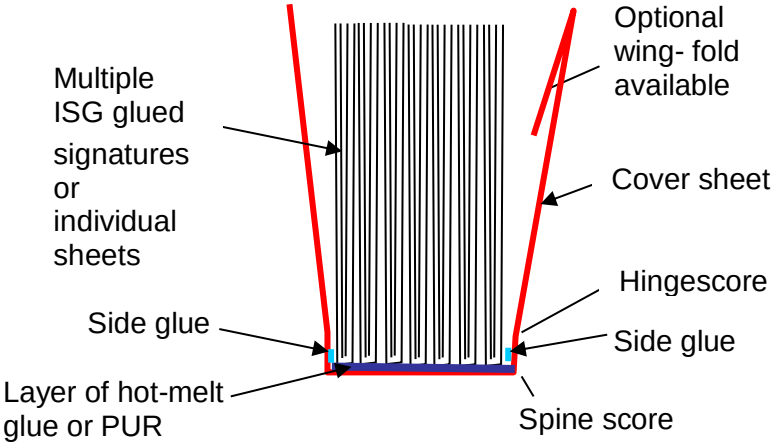
Book block automatic feed into clamps
(in-line operation)

8.2.5 Perfect-binder operation

The Perfect binders PB-600B and PB-1500W use two glue applicator rollers and a reverse spinner roller to accurately control the EVA 'hot-melt' glue layer. Alternatively, PUR gluing (Polyurethane reactive glue) is available in place of EVA hot melt. Side rollers (or nozzles) are also fitted to apply glue to each side of the book, close to the book- spine. When using ISG cold glued signatures (SB-4 only) then spine preparation (cutting, milling, or roughing) is not necessary so there is no noise or dust produced. Since the glue does not need to adhere to the fibres on the edge of each sheet (only to the signature folds) the process does not require sensitive operator settings and is not susceptible to paper condition.



ISG-glued signature (16-32 pages) with cold glue dots between sheets



The cover feeder applies multiple score lines to each cover to assist it to bend around the book and to open easily (including optional 'gate-fold' or 'wing-fold' creasing). The resulting square-back books resemble those produced by conventional high-quality burst-bound or thread-sewn binding processes. The SB-4 significantly reduces the number of redundant

(blank) pages in the book by automatically varying the number of pages in each signature using the printed bar codes.

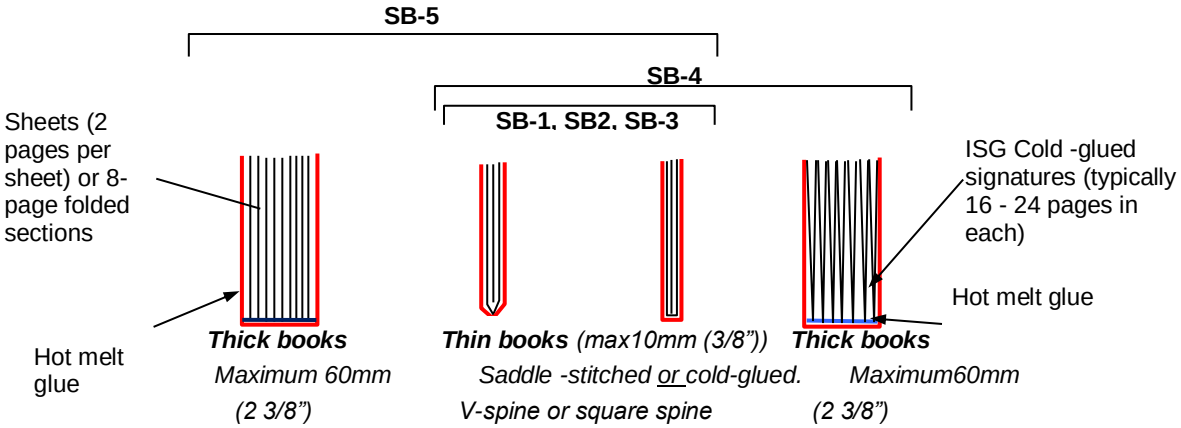
Book blocks may be fed automatically into the binder clamp(s) using the automated feeder options or may be loaded into the clamp by hand.

8.2.6 Optional book trimmer

A thick book trimmer may be used after the perfect binder, either in-line or off-line, to trim books to finished size. The CMT130 or CMT-330 trimmer limits the maximum book thickness to 51mm (2"). Optional heavier–duty and faster trimmers are available allows for books up to 70mm (2 3/4") thick.

In-line version CMT-130 3-side book trimmer

8.3 Summary of booklet and book binding options



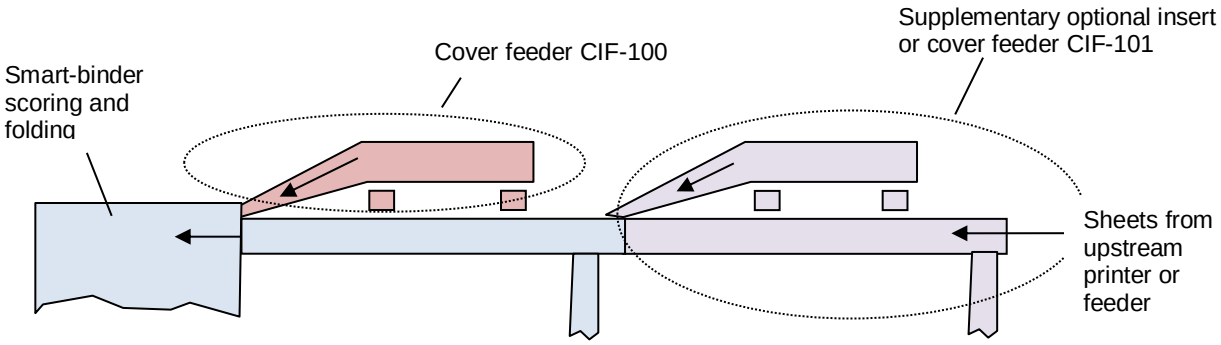
9 Smart-binder Options

9.1 Cover and Insert-Sheet feeding

Separately-printed cover or insert sheets may be added to the digitally-printed sheets coming from the printer or pile feeder.

The standard cover feeder allows for one cover or insert sheet. The cover feeder may be fitted with an optional Cover Autoloader CAL-101 which increases the maximum over pile height from 20mm to 200mm (3/4” to 7 7/8”)

Other options include an additional feeder (CIF-101) for extra insert sheets or covers.



The CIF-101 is used in conjunction with the normal cover feeder CIF-102. Both are identical feeders, but the assembly CIF-101 includes a second sheet transport conveyor below. CIF-100 cover feeder assembly does not include a sheet conveyor below because this sheet conveyor is part of the standard base-model Smart-binder.

An optional cover code reader (bar code reader BCR-105 or 2D code reader DCR-101) is available to check matching of cover to content sheets for personalised book production. **See Appendices 2, 3, and 18** for more detailed information on cover and insert feeding.

Note that when ISG glue binding (instead of wire stitching), then sufficient space must be made in between the last sheet of one book and the first of the next book, into which the cover sheet can be fed. This space is not needed when wire-stitching because the cover can then be fed on top of the last sheet in each booklet.

9.2 Booklet trimming with optional center-knife

When making saddle-bound books then the integrated Smart-binder trimmer delivers high quality 3-side trimmed output. There is also an option for a lower cost single knife trimmer (or for no trimmer).

The trimmer also includes the option for a center-knife CKN for 2-up production. See Appendix 15.

A different type of 3-knife trimmer for thicker perfect-bound books may be supplied as part of the SB-4 or SB-5 system to trim books to size after the Perfect Binder. The trimmer may be supplied to operate either in-line or off-line.

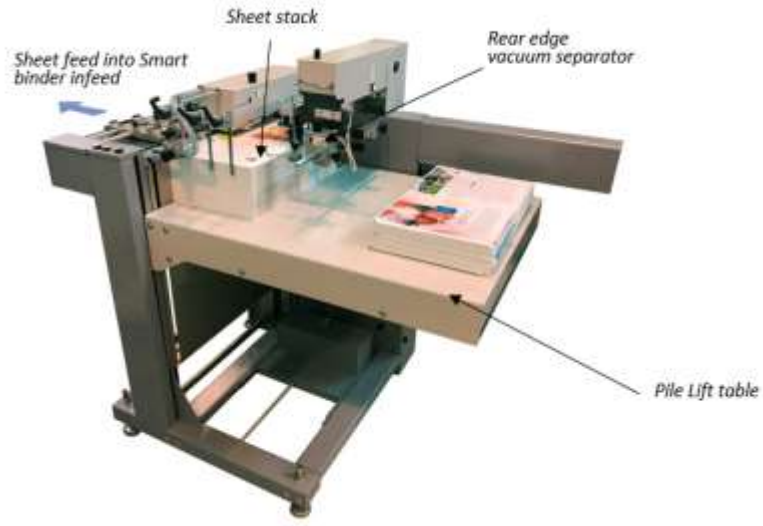
9.3 Trimmer waste removal (for saddle-bound booklets)

Cut-off waste from the trimmer may be removed by the optional TWC-100 or TWC-101 waste removal conveyors. See Appendix 8. These collect the waste trim-off paper strips for both the front knife and the side knives (and optional center-knife) and delivers these wastepaper strips out of the side of the machine into a collection bin.

Alternatively, a collection chute with a circular outlet may be fitted to connect to a pneumatic (vacuum) waste extraction system. See Appendix 28.

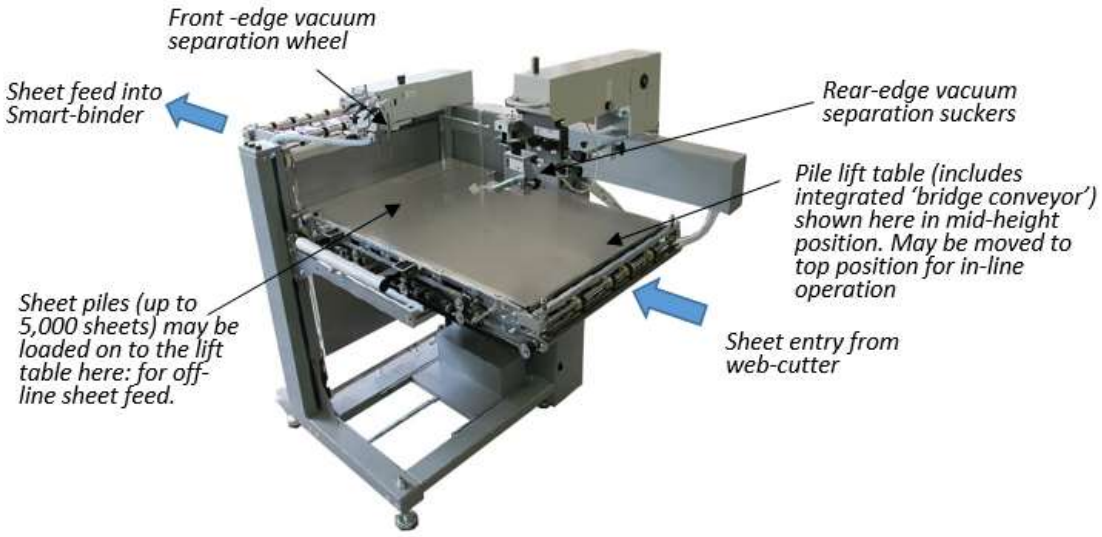
9.3.1 Sheet feeding for Smart-binder off-line operation

The direct-connected pile feeder (Option SB-095) is available to allow dedicated off-line operation and the optional loading trolley systems PLT-100 or HPL-100 are available to assist pile loading. See Appendix 5.



An additional pile feeder on the side (SB-096) may also be used in combination with SB-095, See Appendix 25.

If requiring to feed the Smart-binder from a sheet pile feeder or from a web cutter, with quick changeover between the two modes of operation, then the SB-097 feeder is available. See Appendix 7.



9.4 Additional Sheet Folding

An additional sheet 'buckle-folder' (model RF-100, F-100, F-101 or F-200) may be used directly before the Smart-binder infeed. See Appendix 13 and 14. The F-100, F-101 and F-200 folders may be used to fold each sheet in half to reduce the minimum paper stock weight from 60 gsm to 40 gsm, or to increase the page throughput speed of the Smart-binder. These folders may also be used to enable small book formats to be made from large sheets by applying an additional fold.

F-100 cross-folder unit used directly before SB infeed

.

The folder may include a90-degree sheet rotator on the infeed conveyor in which case it is referred to as an **'RF-100'**. This enables small format books to be produced from a 'wide web' and avoids having to change to a 'narrow' paper web.

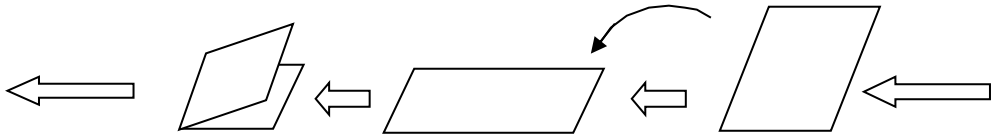
For example: to produce A5 (or 5 1/2" x 8 1/2") booklets, print oversize A3 sheets (or 12 x 18"). These sheets will be delivered from the web cutter long-edge leading. The RF-100 then

rotates each sheet by90-degrees to short-edge leading. Each sheet is then folded in half to give an oversize A4 (9 x 12") section with the folded edge leading. These folded sections are then fed into the Smart-binder and processed normally.

Since sheets are folded into sections before entering the Smart-binder, and books can only be made from whole sections, it is only possible to make books with pages in multiples of 8-pages.

Folded sections are more bulky than flat sheets, so this technique reduces the maximum number of pages in the book.
The maximum printer web speed when using the RF-100 is approximately 100m/min (328 ft/min) and the maximum printer web width is approximately 457mm (18").

Sheet flow through "Rotator/Folder"



Folded to smaller format folded section, deliver to Smart-binder fold leading

Rotated to short edge leading

Sheet long edge leading from cutter

Both the rotating and folding processes may be deactivated when it is required to pass sheets through the RF100 without rotating or folding.

The RF-100 folder may be fitted with optional anti-static bars to reduce the static charge on the sheets delivered to the Smart-binder.

When using ISG gluing together with pre-folded sheets, then a second cold-gluing nozzle must also be installed in the folder (to place a line of glue inside the folded sheet). See option FGS-100.

It is not recommended to use the RF100 rotate function if the sheet weight is less than 60 gsm, or if the sheet input rate is higher than approximately 250 sheets/min.

If using ISG cold glue binding together with an extra buckle folder then an additional glue nozzle FGS-100 must be installed inside the folder.

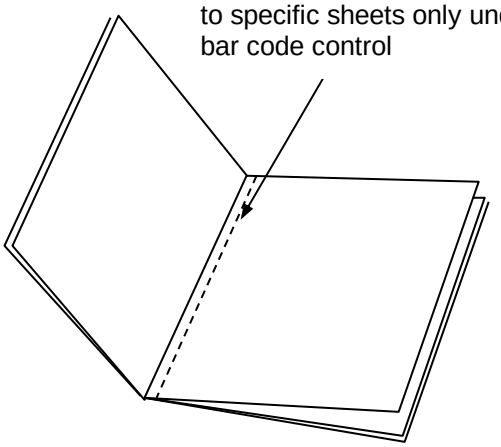
The F-200 folder is a 'special' selective folder capable of varying on-the-run between onefold and two folds. See Appendix 30. This folder should be selected (in combination with a dynamically-selective web cutter) when wishing to run the Smart-binder at speeds over 130 m/min (430 ft./min) web and requiring the number of pages in the book to vary in 4-page increments, not 8 pages.

9.5 DMP-100 Sheet dynamic micro-perforation option

Option DMP-100 provides an extra module integrated into the Smart-binder, in-between the infeed side-register conveyor. Sheets passing through this perforator module may be perforated so that any one sheet can be easily torn out of the book later.

DMP-100 perforator module fitted before SB folder.

Line of perforation 'slots' allows sheet to be easily torn-out. Applied selectively to specific sheets only under bar code control



The addition of this module increases the machine length by 325mm (12 ¾").

The DMP-100 requires an external high pressure air supply.

Perforations may be applied to the left of the center fold, the right of the center fold, or on both sides, selectively on each sheet under bar code control (requires extra bar code digit for perforation control).

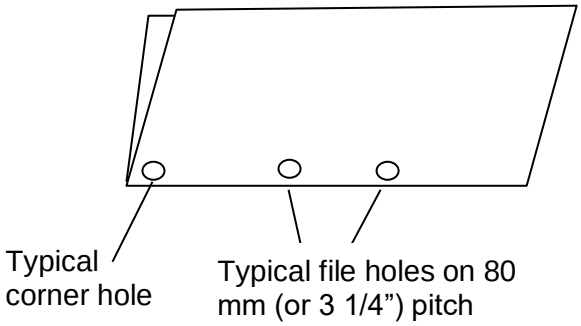
The DMP-100 contains as standard two independent perf heads.

The DMP-101 option is provided with four independent perf heads.

Refer to IBIS for further details, if needed.

9.6 Hole punching or drilling (Options CHP-100, HPM-100, and HDM-100)

As an alternative to loop-stitches, punched or drilled holes may be added to the book spine. See Appendix 22 for details about option CHP-100



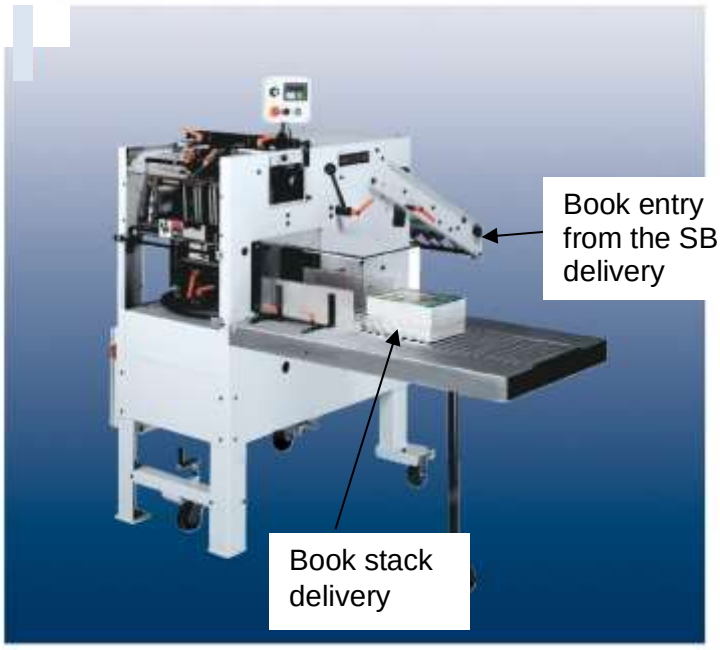
A single corner hole may be punched added using CHP-100 punch module which is installed inside the Smart-binder trimmer.

Two or three file holes may be made using a hole-punch module (HPM-100 or HPM-101) for books up to4mm (5/32”) (3/8”) thick, or hole-drilling module (HDM-101) for books up to 50mm (2”) thick. The HPM-100 and HDM-100 modules operate either in-line with the Smart-binder delivery conveyor, or off-line. Contact IBIS for more details.

9.7 Book stacking BSS-10 and BSS-11

The BSS-10 and BSS-11 book stackers allow non-stop Smart-binder operation without the need for the operator to continually have to remove books from the delivery conveyor. Books pass through the standard delivery conveyor into the BSS-11 stacker where they collect into horizontal piles up to 330mm (13” high). The number of books in each pile is selectable by the machine operator. A turntable in the stacker enables books within each pile to be stacked in batches with spines in each batch in the opposite direction to the spines in the next batch. This ensures pile stability by avoiding all the spines being on the same side.

Book piles are delivered onto a free running roller table where they accumulate until removed by the operator. In-line (or off-line) pile ‘strapping’ is also available: See Appendix 29.



The BSS-11 book stacker: *for in-line connection to the Smart-binder delivery conveyor*

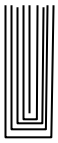
The BSS-10 stacker may be fitting with Option SBCR which provides a bar code reader and additional controller for ‘intelligent‘ stacking. This may be used, for example, to process signatures into ‘book blocks’ for in-line (or manual) feed into the Sprint-binder perfect binder (as part of the SB-4 system).

9.8 Pile strapping

See Appendix 29

9.9 Booklet Spine squaring module Options SM-101 and ARSD-S-100

The Optional SM-101 or ARSD-S-100 ‘spine squarer’ may be attached to the end of the Smart-binder book delivery conveyorto press the book spine into a ‘square’ shape.



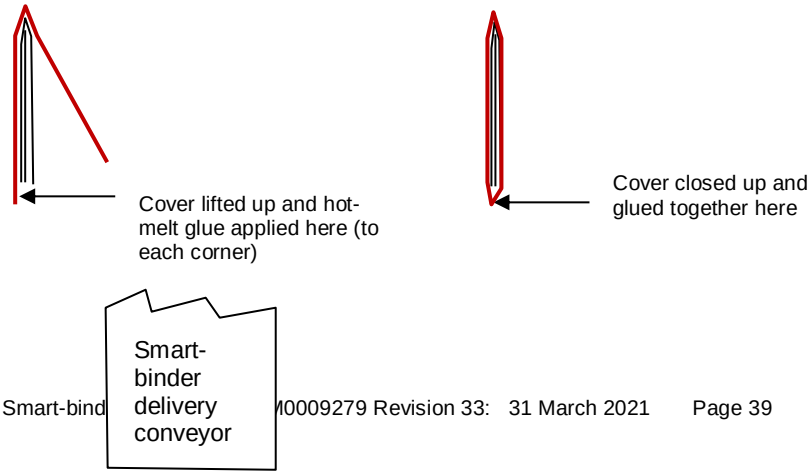
Note: because of individual sheet folding, books produced by the Smart-binder do lie very flat (particularly if ISG cold-glued) and there may not therefore be any significant improvement in flatness after spine-squaring.

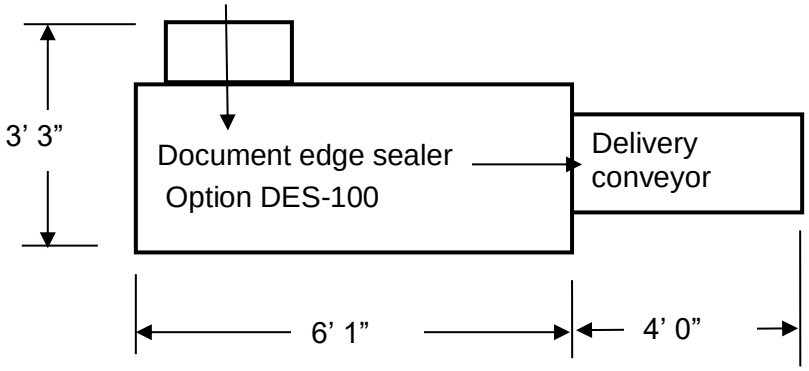
The SM-101 unit (see Appendix 20) gives an acceptable result only when making thinner saddle-stitched books (up to about maximum 3-4 mm thick). Its maximum cycling speed is 1,700 books/hour (28 books/min) so it may reduce maximum SB operating speed if making very thin books. The SM-101 delivers ‘squared-spine’ books either into a small capacity stack on top of the SM-101, or (optionally, with modification) into a separate in-line stacker such as the BSS-11.

The ARSD-S-100 (see Appendix 21) is a heavy-duty and faster version of the SM-101. The ARSD-S can square booklets up to 7 mm (1/4”) thick.

9.10 Document Edge Sealing DES-100

The optional document Edge Sealing system DES-100 may be installed in-line with the Smart-binder delivery. Edge sealing is achieved by making stitched (or ISG cold glued) booklets with a cover sheet which is wider than the inside sheets (in this case the inside sheets will not be front edge trimmed). The booklets will be conveyed to the DES-100 in-line edge sealer by the Smart-binder delivery conveyor. They will enter the edge sealer ‘spine-leading’ and will immediately be direction changed to ‘head leading’. A pair of vacuum belts open the outer cover to allow hot melt glue to be applied to the inside edge of the cover. The outer cover is then closed, and the glue will seal the front edge of each booklet. A special glue may be used which allows the document to be ‘peeled’ open.



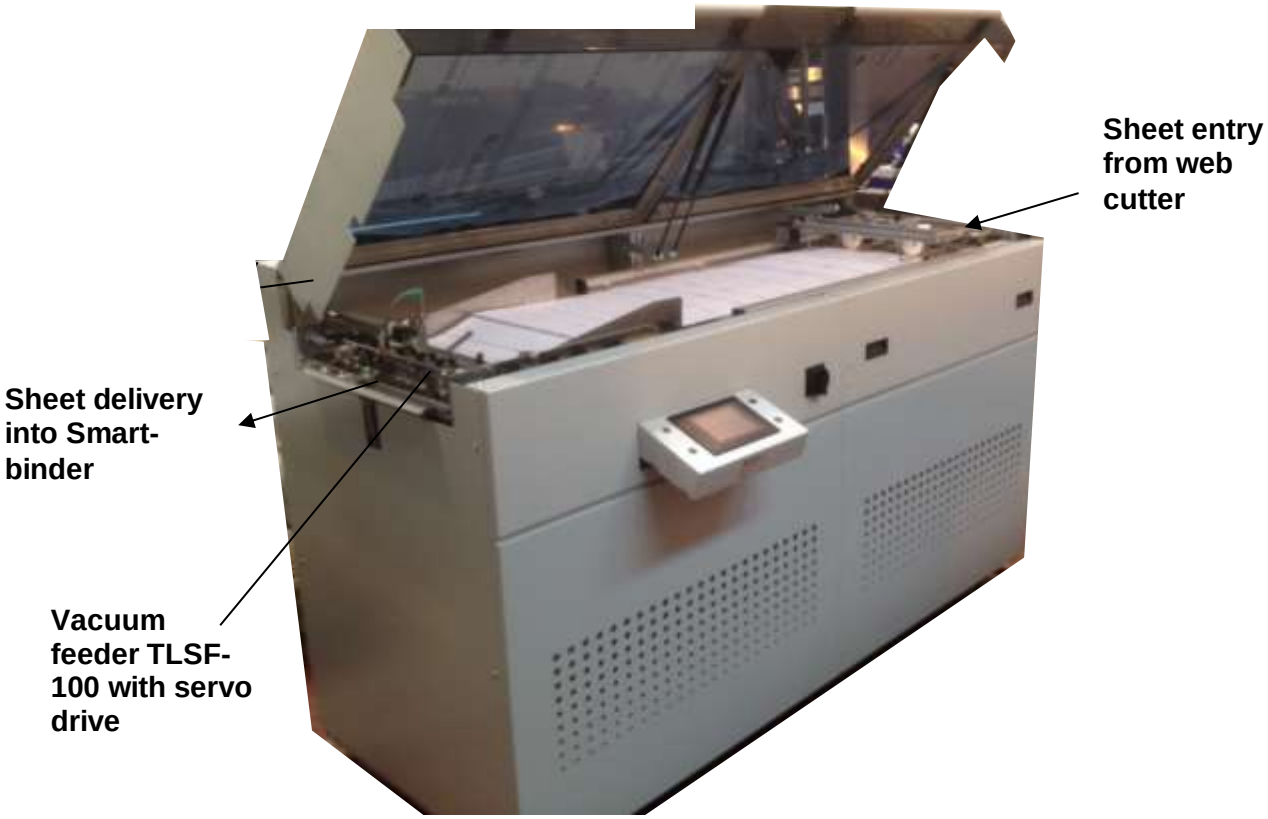


9.11 SBS-100 sheet buffer module

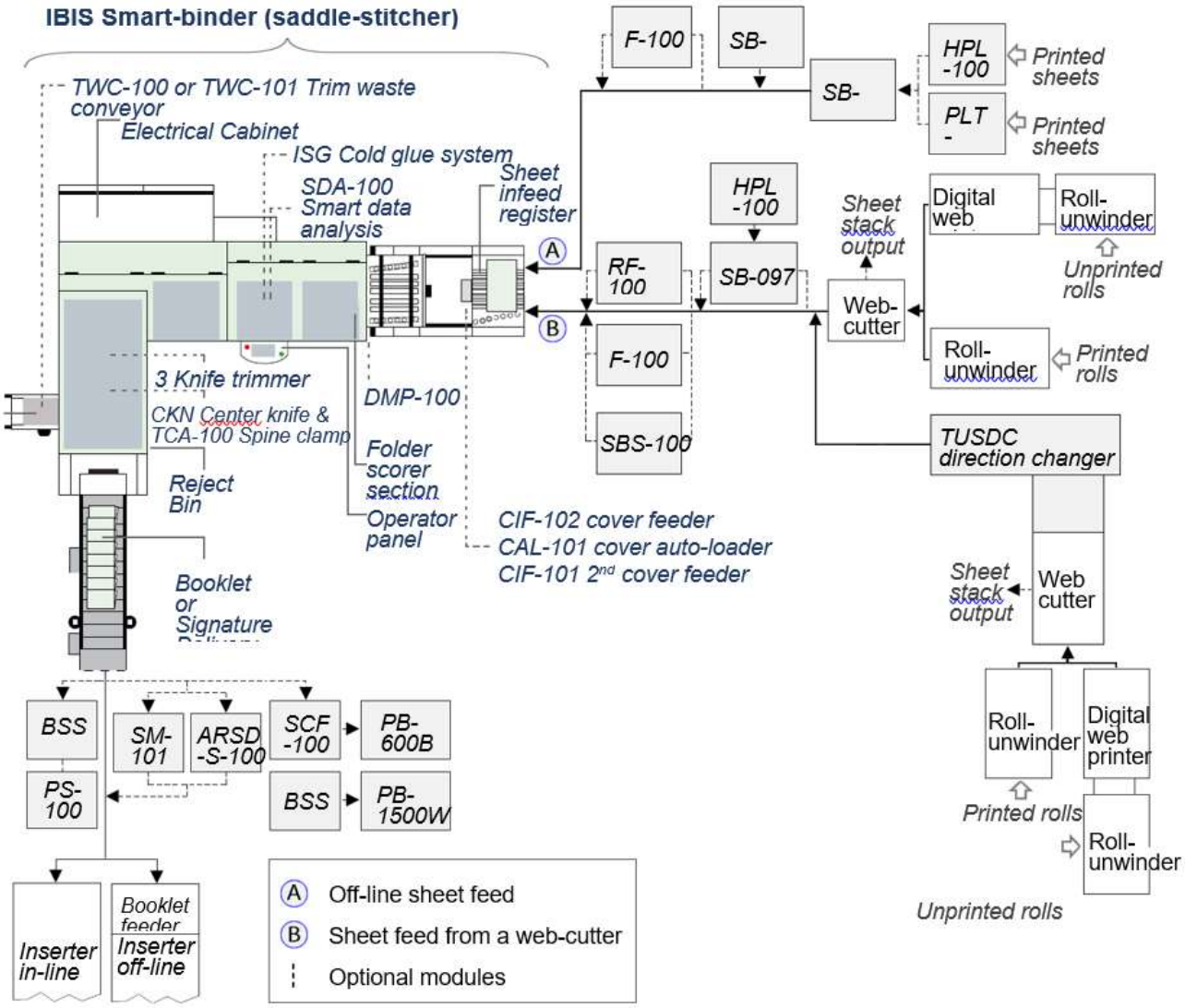
When running in-line with a web printer, the SBS-100 buffer system may be used to help produce a small proportion of very thin booklets (mixed with thicker booklets) without slowing down the printer. See Appendix 10.

A further benefit of the SBS-100 sheet buffer system is that the Smart-binder may be stopped for a short time without stopping the upstream web cutter (or web printer).

SBS-100 Sheet buffer module



9.12 Summary of Smart-binder configurations and optional equipment



ARSD-S-100	Spine squaring module	RF-100	Sheet rotator and buckle folder
BSS	Booklet stacker (BSS-11 & BSS-10)	SB-095	Sheet pile feeder
DMP-100	Dynamic perforator	SB-096	2nd Sheet pile feeder (use with SB-095)
F-100	Buckle folder	SB-097	Sheet pile feeder, allows sheets to pass over the top (in-line use)
HPL-100	Pile loading trolley	SBS-100	Sheet buffer and re-feed module
PB-1500W	5-clamp perfect binder	SCF-100	Signature collector and feeder
PB-600B	1-clamp perfect binder	SM-101	Spine squaring module
PLT-100	Pile loading trolley (for use with SB-095 only)	TUSDC	Sheet separator and sheet direction change modules
PS-100	Pile strapper		

Full list of Options

Part no.	Description	Function	Appendix number
ISG-100	ISG cold glue binding system (integral part of the SB-3)	Provides cold-glue binding as an alternative to wire stitching. This fitted to the SB-3 but not to the SB-2 (note: requires high pressure air supply to the glue reservoir).	See Appendix 1
SB-095	Sheet pile feeder for connection directly to the sheet infeed conveyor. Includes air pump and interface parts.	For dedicated off-line operation from a pile of digital-printed sheets.	See Appendix 5
SB-096	Sheet pile feeder mounted on the side (with roller table to change sheet direction) Includes air pump and interface parts.	To allow an off-line Smart-binder (with direct-connected sheet pile feeder SB-095) to also feed from an additional sheet pile feeder on the side.	See Appendix 25
SB-097	Sheet pile feeder mounted in-line (with bridge conveyor to transport sheets over feeder when running in-line) Includes air pump and interface parts.	To allow a Smart-binder fed from a web cutter to also be fed from an in-line sheet pile feeder *(combined in-line and off-line operation).*	See Appendix 7
F-100 or F-101 or F-200	Cross-Folder (buckle fold)	The F-100 or F-101 may be used directly before the Smart-binder infeed register conveyorto allow web speeds in excess of 130meters/min using 8-page sheets, or to run paper stock weights below 60 gsm. The F-200 is a more expensive 'selective' folder which can vary on the run between producing 8 and12-page signatures.	See Appendix 13
RF-100	Rotator/folder	The RF-100 may be used directly before the Smart-binder infeed register conveyorto rotate and fold sheets *(for production of small format books from large 8-page sheets)*.	See Appendix 14
MS-45	Knife folder	May be used directly at the end of the trimmer delivery conveyor (in-line) to put one extra 'knife-fold' in the finished document.	See Appendix 26
RRT-100	Roller table	May be used to change sheet direction	Refer to IBIS for further details

RRT-101	Roller table	May be used to change sheet direction by90-degrees. Includes an input bridge conveyor with separate drive	Refer to IBIS for further details
RRT-105	Roller table		Refer to IBIS for further details
CIF-102	Cover or insert sheet feeder (high-speed version)	Used to feed a separately-printed cover sheet onto the outside of the book or an insert sheet inside the book	See Appendix 2
CIF-101	Additional cover or Insert sheet feeder	Additional insert or sheet feeder (includes extra sheet conveyor below)	See Appendix 18
CAL-101	Cover Autoloader for use with CIF-102 or CIF-101	Increases maximum cover pile height from 20 to 200mm (3/4” to 7 7/8”)	See Appendix 3
DMP-100	Dynamic Micro-perforator system with 2 perf heads	Can add multiple perforations to selected sheets parallel to the spine (under bar code control) so these sheets can be torn out of the finished book	See Appendix 11
DMP-101	Dynamic Micro-perforator system with 4 perf heads	Can add multiple perforations to selected sheets parallel to the spine (under bar code control) so these sheets can be torn out of the finished book.	See Appendix 11
HPM-100	Hole punch module	Independent, self-driven module may be installed at the end of the Smart-binder delivery to add punched holes to the finished book. Different modules are available to suit performance requirements *Max book thickness: 4 mm (1/8”)*	Refer to IBIS for further details
CHP-100	Corner Hole punch device	May be installed inside the Smart-binder trimmer to add a punched hole in the corner of each booklet *Max book thickness: 4 mm (1/8”)*	See Appendix 22
HDM-101	Hole drilling module	May be installed at the end of the Smart-binder delivery to add drilled holes to the finished book. *Max book thickness:50mm (2”)*	Refer to IBIS for further details
BSS-11	Booklet stacker module	May be installed at the end of the Smart-binder delivery to create completed booklet stacks (piles).	See Appendix 9
BSS-11	Booklet or signature stacker module	May be installed at the end of the Smart-binder delivery to create completed book stacks (piles). May be fitted with optional Intelligent stacking controls (see below) to	See Appendix 9

		deliver (for example) stacks of signatures for feed into the perfect binder.	
SBCR-100	Intelligent stacking options for BSS-10 stacker	Includes bar code reader and separate controller	See Appendix 9
BSS-30	Palamides stacker	Alpha 500 stacker. Maximum stack height 120mm (4 ¾"). Optional gluing between sigs to create book blocks for perfect binding.	See Appendix 27
SCF-100	Signature collector and feeder	Collects signatures together under bar code control and delivers them into the clamp of the PB-600B binder *(used if the PB-600B is selected as part of the in-line SB-4 system)*	Refer to IBIS for further details
PB-600B binder	Perfect binder with cover feeder (400 bks/hr)	Use to make perfect-bound books at up to 400 bks/hr *(single shift work). May be auto-fed from the SCF or SSF for in-line operation*	Refer to IBIS for further details
PB-1500 W	Perfect binder (5 clamps)and cover feeder (1500 books/hr)	Use to make perfect bound books up to 70 mm (2 ¾") thick at up to 1500 books/hr *(may be auto-fe for in-line operation)*	Refer to IBIS for further details
CMT-130	CMT130 3-side trimmer	Use for final trim of perfect bound books up to 51mm (2") thick *(may be used off-line or in-line with the binder)*	Refer to IBIS for further details
CMT-330	CMT330 3-side trimmer	Use for final trim of perfect bound books up to 51mm thick (2") *(may be used off-line or in-line with the binder)*	Refer to IBIS for further details
SM-101	Spine squaring module	May be fitted directly to the end of the Smart-binder delivery conveyor, to press the spine into a 'square' shape. Only for books up to about6.5mm (1/4") thick. Maximum speed 1700 books/hr.	See Appendix 20
ARSD-S-100	Spine squaring module	May be fitted directly to end of Smart-binder delivery conveyor to press the spine into a 'square' shape. For books up to about 10mm thick (3/8"). Maximum speed 3,200 books/hr.	See Appendix 21
DES-100	Document edge sealer	May be fitted directly to end of Smart-binder delivery to glue the edges of the over-size cover together. Used to secure	Refer to IBIS for further details

		‘sensitive/confidential ‘documents such as exam papers.	
SBS-100	Sheet buffer module	May be installed as part of an in-line Smart-binder system in between the web cutter and Smart-binder infeed. Allows very thin booklets, when mixed with thicker booklets, to be produced without slowing down the printer.	See Appendix 10
BCR-105	BS3 Bar-code reader for the cover/insert feeder CIF-102 or CIF-101	May be used to match bar codes on covers with bar codes on sheets	See Appendix 16
DCR-101	2DDatamatrix reader for the cover/insert feeder CIF-102 or CIF-101	May be used to match bar codes on covers with bar codes on sheets	See Appendix 16
FGS-100	Folder glue system	Used to apply a line of ISG cold-glue inside the F-100, F-101 or RF-100 folders.	See Appendix 13
TFR-100	Voltage transformer for main power supply	For use when the factory supply voltage is outside the 380V–415V range *(e.g., for installations outside Europe)*	Refer to IBIS for further details
SST-101	Standard Hohner 43/6S stitch head, with clincher, centring device wire guides and 2.5 Kg wire spool holder	To supplement the two stitch heads normally supplied with each Smart-binder *(for jobs requiring 3 or 4 stitches).* *The 43/6S may be used for books up to7mm (9/32”) thickness*	See Appendix 31
SST-100	Standard Hohner 43/6S stitch head and clincher, <u>without</u> centring device, wire guide or wire spool holder	For use as a <u>spare</u> stitch head. *(recommended to be ordered with each new machine)* *The 43/6S may be used for books up to7mm (9/32”) thickness*	See Appendix 31
SST-105	Standard Hohner 52/8 stitch head, with clincher, centring device wire guides and 2.5 Kg (5 ½ lbs.) wire spool holder	To supplement the two stitch heads normally supplied with each Smart-binder *(for jobs requiring 3 or 4 stitches)* *The 52/8 may be used for books up to10mm (3/8”) thickness*	See Appendix 32
SST-106	Standard Hohner 52/8 stitch head and clincher, <u>without</u> centring device, wire guide or wire spool holder	For use as a <u>spare</u> stitch head. *(recommended to be ordered with each new machine)* *The 52/8 may be used for books up to10mm (3/8”) thickness*	See Appendix 32
LST-100	Loop (Omega) stitch head	May be used to replace <u>standard</u> stitch heads to produce loop stitches	Refer to IBIS for further details
LSM-100	Loop (Omega) stitch drive modification	Stitcher drive upgrade needed when using loop stitch heads	Refer to IBIS for further details

SDI-100	Stitcher drive automatic inhibit system	May be used to automatically inhibit stitching (for example if producing single 4-page folded sheets).	See Appendix 19
HKS-100	Two 100Kg wire spool holders and spools (floor mounted)	May be used instead of normal2.5Kg (5.5lbs.) wire spools. Recommended for long run applications and to reduce wire pull force needed.	See Appendix 12
WST-100	Handling trolley for 100 Kg wire spools (includes hydraulic lifting jack)	Used in conjunction with HKS-100 (above)	See Appendix 12
CKN-100	Trimmer center knife assembly with ¼" wide trim-out knife	Use to make small format booklets: 2-up production. Maximum book thickness approximately 3mm (1/8")	See Appendix 15
CKN-101	Trimmer center knife assembly with 3/8" wide trim-out knife	Use to make small format booklets: 2-up production. Maximum book thickness approximately 4 -5mm (3/16")	See Appendix 15
CKN-102	Trimmer center knife assembly with single bladed knife (no trim-out)	Use to make small format booklets: 2-up production. Maximum book thickness approximately 6-7mm (1/4")	See Appendix 15
TWC-100	Trimmer waste removal conveyor	Used to remove trimmed-off paper if no pneumatic waste extraction system is available.	See Appendix 4
TWC-101	Trimmer waste removal conveyor (High level delivery for large bin collection)	Used to remove trimmed-off paper if no pneumatic waste extraction system is available.	See Appendix 4
PLT-100	Pile loading trolley	Used together with Sheet feeders SB-095 or SB-096 to reduce sheet reload time from about 3 minutes to about 35 secs.	See Appendix 6
HPL-100	Hovmand pile loading system	Used together with Sheet feeders SB-095, SB-096, or SB-097 to reduce sheet reload time from about 3 minutes to about 35 secs.	See Appendix 8
B000 0586	Trimmer clamp assembly for very thick books	May be used to reduce spine 'corner-tearing' when making thick books.	See Appendix 17
TWB-100	Trimmer waste collection bin	Use to collect trim-off paper from waste removal conveyor TWC-100.	Refer to IBIS for details
TCC-100	Trimmer waste chute	Use instead of TWC-100 to connect trimmer to customer-supplied vacuum paper waste extraction system.	See Appendix 40
BDC-100	90-degree bend conveyor	Puts book delivery conveyor at 90 degrees to reduce overall machine width	Refer to IBIS for details

PS-100	In-line pile strapper	Used to apply a plastic strap around each booklet or signature pile. Normally used in combination with stacker BSS-10 or BSS-11	See Appendix 29
NSP-100	Non–standard paint color	Choose if the machine color needs to be different from the standard IBIS 'ivory white' and grey color scheme (extra cost).	Refer to IBIS for details
SPK-100	Essential Smart-binder spare parts kit	Includes all parts that must be held close to the machine to support normal operation. *Refer to IBIS for spare parts relating to optional modules.*	Refer to IBIS for details
SPK-101	Basic Smart-binder Spare Parts Kit	Includes all parts recommended to be held close to the machine. *Refer to IBIS for spare parts relating to optional modules.*	Refer to IBIS for details
SPK-102	Extended Smart-binder spare parts kit	Includes all parts recommended to be held by distributors in each country when the installed base exceeds 3 units. *Refer to IBIS for spare parts relating to optional modules*	Refer to IBIS for details
SKK-100	Spare set of trimmer front and side knives (upper and lower)	It is recommended to hold two spare sets of knives for each machine *(one ready to fit and one being reground).*	Refer to IBIS for details
SCK-101	Spare set of trimmer center-knives (1/4" trim out)	It is recommended to hold two spare sets of knives for each machine *(one ready to fit and one being reground)*	Refer to IBIS for details
SMK-100	Scheduled maintenance kit	All parts that are required to be changed at regular intervals (every 3000 running hours)	Refer to IBIS for details
SMP-100	Scheduled Maintenance Programme SMP	Chose this option for all scheduled maintenance to be carried out by IBIS.	Refer to IBIS for details
CSP-100	Customer support program CSP	Chose this option for enhanced support program from IBIS.	Refer to IBIS for details

10 Using the Smart-binder

10.1 Book and sheet integrity checking

All Smart-binders have a code reader fitted (bar-code reader or 2DDatamatrix code reader) which reads a code printed on each incoming sheet. If there are no codes printed on the sheets then the Smart-binder can be set to produce booklets with a fixed ‘selectable’ number of sheets, based on a simple count, but it is then very difficult for the operator to ensure that sheets are in the correct position in each booklet and there is a high risk that bad booklets will be delivered.

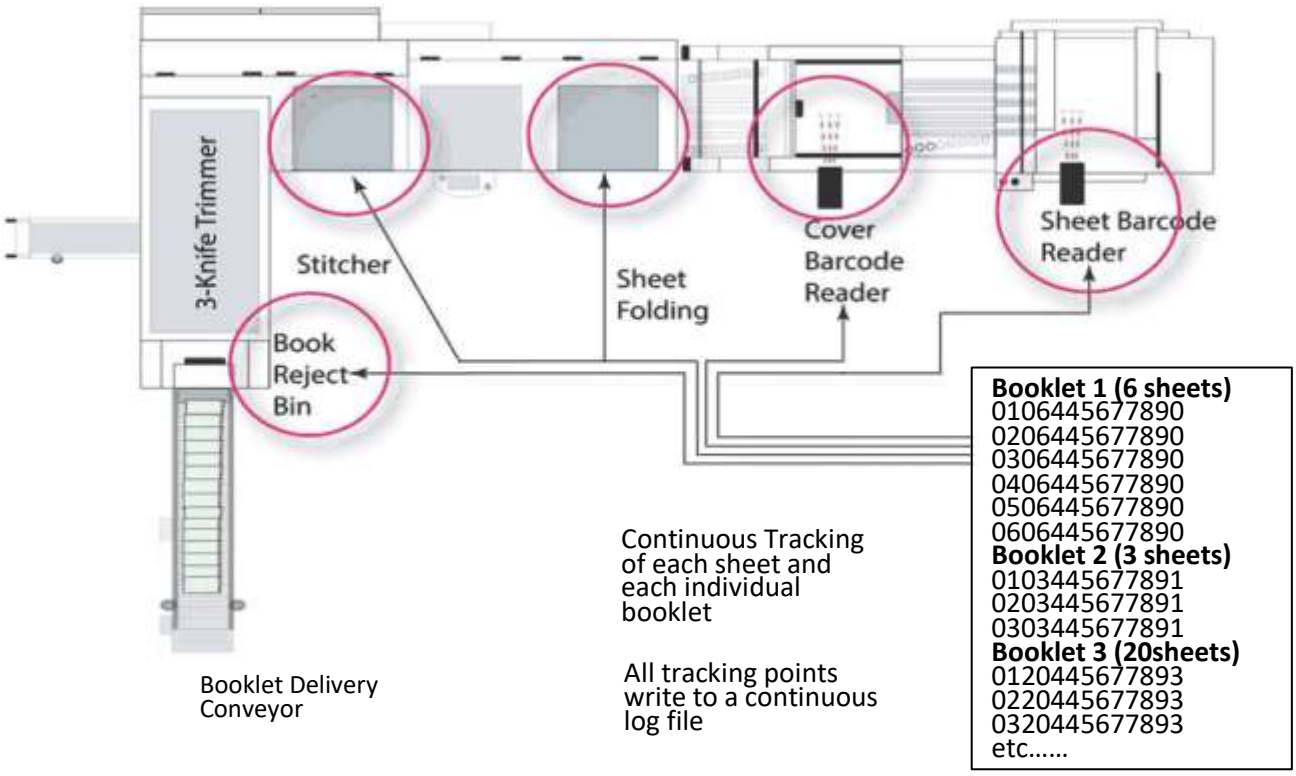
Assuming sheets are coded then the Smart-binder tracks each sheet and each saddle-bound booklet (or signature) using the information from the barcode to ensure that only books/signatures with the correct pages in the correct sequence are delivered as “good” onto the delivery conveyor. Any “bad” books are automatically rejected into the reject bin below the trimmer. If each booklet contains a unique ID number in the bar code, then the Smart-binder machine controller (PC) retains production data on each individual booklet that may be accessed by the user. Booklets which fail to be delivered onto the Smart-binder delivery may require to be reprinted and this re-print signal can be provided by the Smart-binder controller. The optional SDA-100 system assists the creation of reprint signals for rejected/missing booklets (see next section).

The Smart-binder can read all common barcode or 2D code symbologies, depending on the reader that is selected. The code can be trimmed off from the finished booklet by the Smart-binder three-knife trimmer if the code is not to remain visible on the finished booklet or signature.

Additionally, the Smart-binder can match separately-printed personalized covers with the booklet text. In this case a reader in the cover feeder will compare the ID number printed on each cover with the ID number on the inside text sheets. The Smart-binder can be set to either stop when a mismatch or other fault is detected, or to reject the faulty booklet by placing it into a reject bin.

If a unique booklet ID is added to the code printed on each sheet, then the Smart-binder will automatically check that all sheets in each booklet contain the same ‘ID’ number to ensure that sheets from one booklet cannot be mixed with sheets from another booklet.

Off-line version Smart-binder : Integrity checking



Booklet data obtained from the code printed on each sheet is written to an internal continuous 'log file' in the Smart-binder's PC. This log file can be accessed to review the status of each booklet, and to create a reprint file, and is an "auditable" file. Smart-binders are used extensively in critical booklet applications such as examination booklets, HIPPA-compliant health care policy booklets, and even surgical instrument instruction booklets which are opened in the operating room.

10.1.1 Other automated features that may be driven by data within the printed code on each sheet:

Selecting the binding method
The code printed on each sheet can be used to automatically switch between ISG cold glue binding and wire stitching. In this way any booklet in a job may be either stitched or glued. Additionally, glue may be automatically inhibited on any sheet so that these sheets can be loose inside a book, or one part of the booklet may be loose compared with the other part.

Selective perforation for sheets "tear-out'
If using the optional DMP dynamic perforation system then the printed codes can automatically control the perforation of each sheet, offering up to 4 different dynamically-controlled perf lines.

10.2 SDA-100 Smart-Data Analysis

The SDA-100 system analyses and present Smart-binder production data on a separate pc screen. It may also be used to assist in the creation of reprint signals for rejected/missing booklets. The SDA-100 is an integral part of the Smart-binder system when running in-line with a digital web printer but is optional when running near-line or off-line. See Appendix 23 for further details.

10.3 Producing personalised (varying thickness) saddle-bound booklets with (optional) matching covers

The Smart-binder system allows for the number of pages in each book to be continually varied (from book to book) without stopping the line, resulting in personalised 'book of one' production. This function relies on the use of barcodes printed on each sheet (or from DFA/DFD control interface if running in-line with cut-sheet printers). The Smart-binder can process ISG cold-glued saddle-bound booklets which vary continually between minimum and maximum thickness without stopping (wire-stitched books require a small stitch head adjustment if changing book thickness by more than about3mm (1/8")).

Note that if some booklets contain fewer than 4 sheets, and these are mixed with thicker booklets, then this will reduce the maximum sheet infeed rate. Refer to IBIS for more details about this speed limitation (which may be avoided by using the optional SBS-100 sheet buffer module)

Personalised book production may also require a matching cover to be fed from the optional CIF-102 cover feeder. In this case an extra cover code reader (option BCR-105 or DCR-101) is available to ensure that the bar-coded book ID number on the cover matches the ID number on the inside sheets (and stops the machine if not matching).

Note: the feeding of a matching cover may be avoided by feeding covers with a die-cut window, to allow external visibility of personalised data printed on the first sheet inside the booklet.

When producing personalised books in off-line mode (using the sheet pile feeder SB-095, see Appendix 5) then the sheet bar code reader may be positioned to read the top sheet in the pile. If applying a personalized cover, then the optional code reader in the cover feeder reads the bottom cover in the pile after it has pre-fed a short distance. If the coded ID numbers on the sheets and cover do not match, then the machine will stop immediately before the first sheet of a book feeds from the pile feeder. This makes it easier for the operator to seek and correct the cause of non-matching sheets and cover, without having to remove sheets or covers from the machine and replace them in their respective feeders.

10.4 Producing personalized (varying thickness) perfect-bound booklets with (optional) matching covers.

The Smart-binder models SB-4 and SB-5 include an in-line perfect binder after the saddle-stitcher. Depending on the perfect binder used, the binding can adjust itself automatically to differing incoming book block thicknesses. An optional extra code reading system is available (refer to IBIS for details) to ensure the applied cover sheet matches the inside book block, if required.

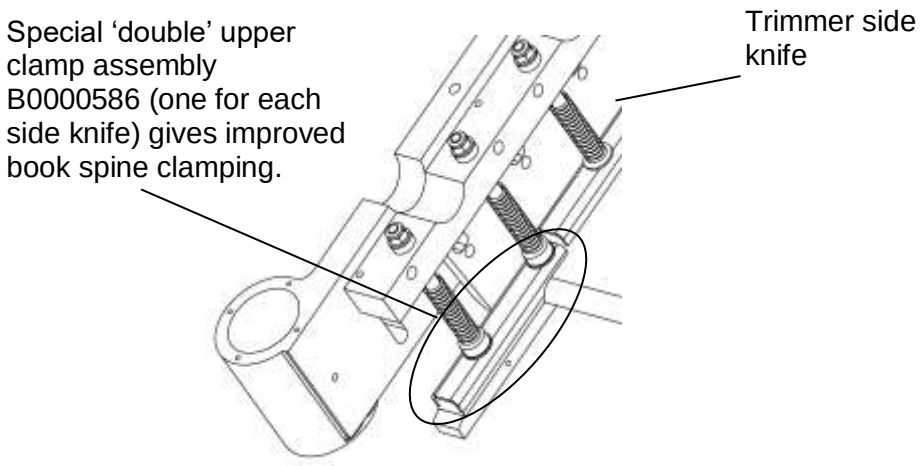
The Smart-binder SB-5 relies on the web cutter/stacker's ability to vary the number of sheets in each pile if wishing to varying book thickness on-the-run. The SB-5 may alternatively process printed sheets into folded signatures and can then vary book thickness by changing the number of signatures in each book under bar code control.

10.5 Producing saddle-bound booklets containing a large number of pages (maximum booklet thickness).

The Smart-binder is able to produce booklets up to10mm (3/8”) thick. This maximum thickness is slightly reduced if feeding pre-folded sheets into the Smart-binder, because of the extra bulk of the head-folds entering the trimmer. When producing booklets using pre-folded sheets, then it is difficult to exceed7-8mm (9/32-5/16”) book thickness due to the extra bulk of the head-folds prior to head trim (note: the Smart-binder head trim removes the folded edges).

The quality of very thick booklets is much improved when using ISG cold-glue binding compares with wire stapled, because the ISG process improves booklets ‘lay flat’.

All saddle-stitcher trimmers tend to create a small tear on the corner of the book spine. This is caused by the side-knife since the V shaped spine cannot normally be securely clamped. A special trimmer clamp system is available on the Smart-binder which can reduce or eliminate this tearing (refer to option B0000586, Appendix 17). This special clamp system is made to suit the width of the book being trimmed. The clamp must be changed if the book width is changed, and the book widths must therefore be stated when ordering this option.



10.6 Using lightweight paper stocks

The Smart-binder is best suited to sheet stock weights in the range 60 to 110 gsm (41 to 74 lb offset). Providing that the paper grain direction is parallel to the spine fold and the paper is a good quality stock, then 50 gsm (34lb offset) is the normal minimum for 4-page sheets that enter the Smart-binder, without any pre-fold.

Stock weights as low as about 40 gsm (27lb offset, 11lb bond) may be used providing the optional F-100, F-101 or F-200 ‘pre-folder’ is selected (see Appendix 13), the grain direction is parallel to the spine, the paper is of good quality and there is not excessive static electrical charge on the paper. In this case each sheet will contain 8 pages instead of 4 pages. If the selective folder F-200 is used, then sheets may contain 8 or 12 pages.

Selection of the IBIS optional anti-static system (Option ASS-100) and enhanced infeed register table (standard supply for all Smart-binders built after 2010 from serial number #52 onwards) is advisable when using lightweight sheets. Refer to IBIS before attempting to run paper weights less than 60 gsm (41lb offset).

When making thick saddle-bound booklets in the 5-10mm (3/16-3/8”) range from lightweight paper then a separate heavier-weight cover sheet is recommended to maintain a quality finished book.

10.7 Using wire stitching

10.7.1 Standard ‘flat’ stitching

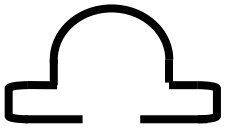
The standard Hohner 43/6S or 52/8S wire stitch heads produce a flat stitch, using round section wire (0.4 – 0.6mm diameter).

The 43/6S has a maximum stitch thickness of 6mm (maximum book thickness7-8mm (9/32-5/16”)) See Appendix 31

The 52/8S has a maximum stitch thickness of 8mm (maximum book thickness10mm (3/8”)). See Appendix 32

Normal flat stitch

10.7.2 Producing books with ‘loop’ stitches (Option LST-100)



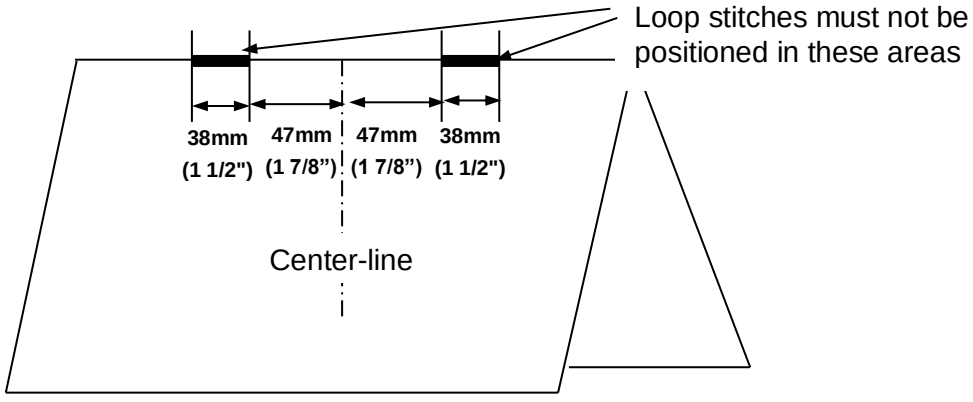
Loop stitch

Loop (Omega) stitches may sometimes be required in place of normal stitches to allow booklets to be placed into ring binders (as an alternative to hole punching). Loop-stitch heads may be selected from the standard Smart-binder options list. Note that the maximum stitch thickness when running loop stitch heads is 4mm (1/8-5/32”) (maximum finished book thickness is 6 mm).

The use of loop-stitch heads requires a modification LSM-100 to the Smart-binder stitch-head drive.

10.7.3 Limitations on positions for loop stitches

Loop stitches cannot be placed in the areas shown below as they would interfere with the trimmer backstops. This does not prevent loop stitches being placed in the standard positions to suit either European or USA ring binders.



10.7.4 Stitcher drive upgrade option LSM-100

An upgrade to the Smart-binder stitcher drive is needed if using loop (omega) stitch heads due to the higher operating force required.

10.7.5 Using the stitcher drive inhibit option SDI-100

If option SDI-100 is selected, then the stitcher drive may be automatically inhibited. This function may be required is producing 4-page folded sheets, or to assist book run-out at the end of a job. See Appendix 11

10.7.6 Using 100Kg (220 lbs.) Wire spools

The standard Smart-binder is supplied with two2.5Kg (5.5lbs.) **wire spools** mounted on the back of the stitcher.

A recommended option is to replace these with **100Kg (220 lbs) wire spools** which are floor mounted behind the stitcher. The advantage of these large spools is that spools will last a very long time before needing replacement and the wire pull force is reduced (which assists stitch head operation). See Appendix 12.

10.7.7 Using the ISG cold glue binding system

ISG cold glue binding is recommended in preference to wire stitching when making self-cover booklets using non-coated (absorbent) paper stocks. The glue bond is reduced if using coated stocks. If feeding a separately-printed cover from the cover feeder and using ISG cold glue binding then there must be a gap after the last sheet of each booklet into which the cover can be fed. Creating this gap may reduce slightly the machine speed, particularly if making very thin booklets, and if feeding from a web cutter, then the cutter must be programmed to create the gap automatically (unless the SBS-100 sheet buffer is used). See Appendix 10.

If using the ISG binding process then the automatic glue detection system ensures that no booklets are produced without glue binding.

Only the IBIS-recommended glue of the correct viscosity should be used. This glue is applied from a reservoir behind the Smart-binder which is pressurized with high pressure air and delivers the glue through a pipe to the applicator nozzle mounted in the Smart-binder folder. Glue is applied in the form of dots to each sheet exactly on the fold line. Dot spacing and dot duration may be varied from the Smart-binder touch screen. The standard nozzle size is 0.4mm, but this may be replaced with 0.3 or 0.2mm nozzles if significantly less glue is required. Using the touch screen, the glue system can be programmed to automatically apply more glue to the outside cover compared with the inside sheets, if required to increase the cover bond strength.

The consumable cost of cold glue is similar to the cost of stitching wire. See appendix 1

10.8 Feeding Covers and/or insert sheets

10.8.1 Covers or insert sheets fed from cover feeder (Option CIF -102)

See Appendices 3 and 16 for information on optional Cover ‘Autoloader’ and ‘Cover Matching’.

When making saddle-bound books, covers or insert sheets must be the same length as the sheets on to which they are fed (same spine length). Covers or inserts that are longer or shorter than the sheets will cause some loss of print registration between sheets. The cover or insert-sheet width does not have to be the same as the content sheet width because covers are independently side-registered before entering the folder.

If feeding covers or inserts from the cover feeder and making ISG cold glued books then there must be sufficient space between the last sheet of one book and the first sheet of the next book into which to feed the cover or insert sheet. If running in-line with a high-speed digitally-printed web, then this may mean that the web cutter must be programmed to pause momentarily to create this gap. If feeding from a pile feeder, then the gap in sheet feeding will be created automatically by the Smart-binder feeder control system.

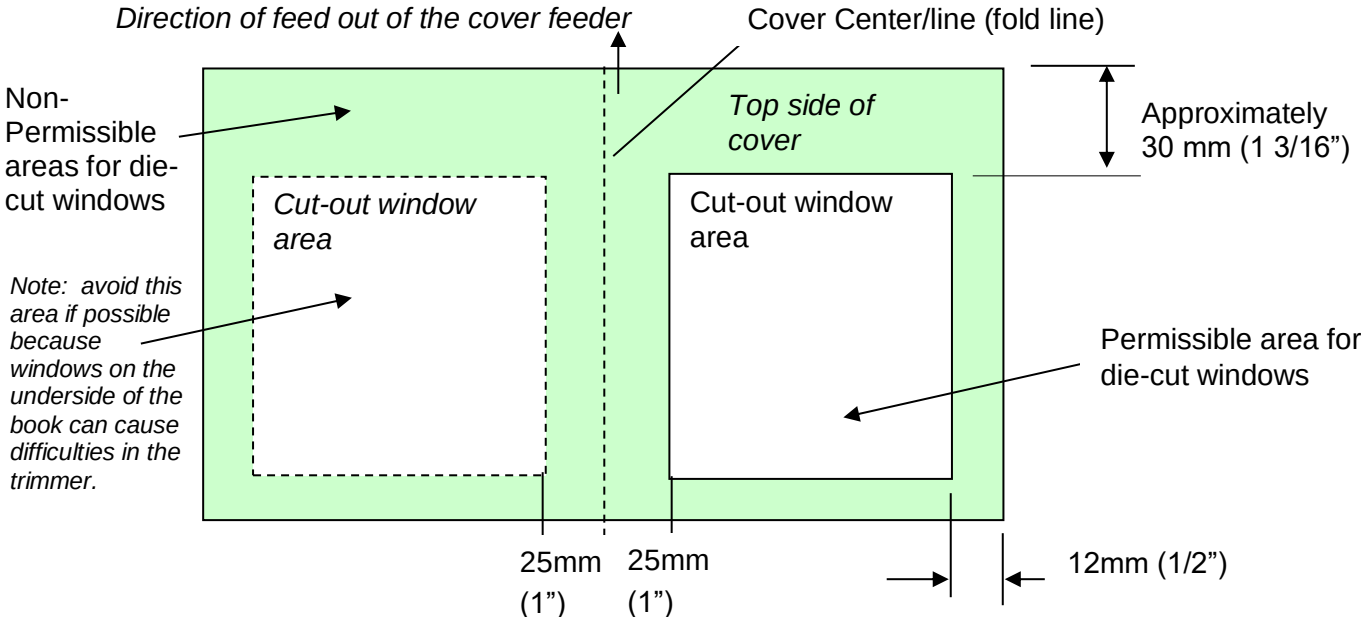
10.8.2 Two cover feeders (using optional extra feeder CIF-101)

The additional CIF-101 feeders may be supplied so that one cover (or insert) 'A' can be fed from the CIF-102 and another cover (or insert) 'B' from CIF-101. See Appendix 18. An extra digit in the sheet bar codes will then determine whether CIF-101 is activated or CIF-102 is activated (or both). This dual feeding may be used to allow covers to be changed frequently without stopping the system, or to allow an insert sheet to be fed into each book in addition to a cover sheet. *(Note: if an insert sheet is required to be fed into the center position within a book then it must be fed into a sheet gap, not on top of another sheet)*

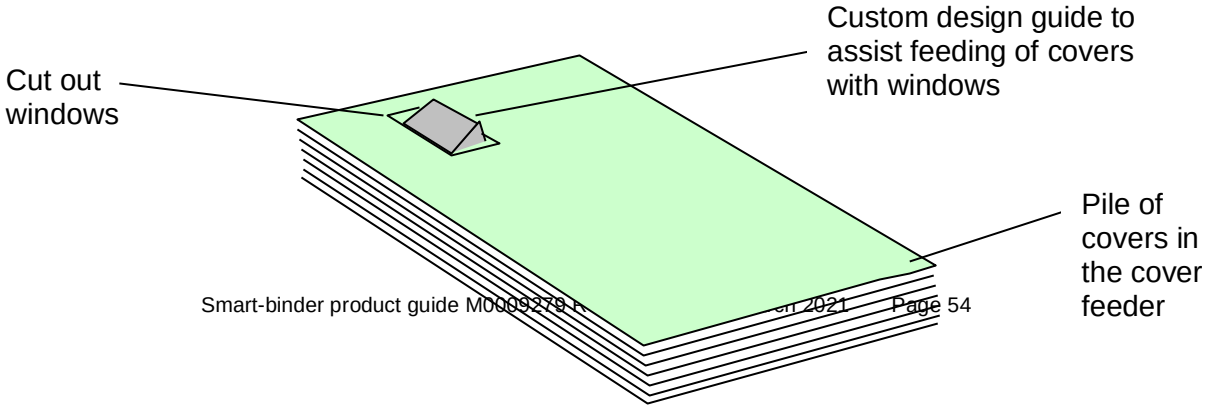
The CIF-101 is only needed if it is required to feed both a cover on the outside of the book, and an insert sheet inside the book. If only the insert sheet is needed, then use the Cover/insert feeder CIF-102.

10.8.3 Feeding Covers with cut-out windows

Covers with die-cut windows may be fed from the CIF-101 or 102 cover feeders depending on the type of cover, and type of cut out. The window should be at least 30mm (1 5/32") wide (measured in the direction of cover flow out of the feeder). There are areas on the cover where it is not possible to position a cut-out window (see below):



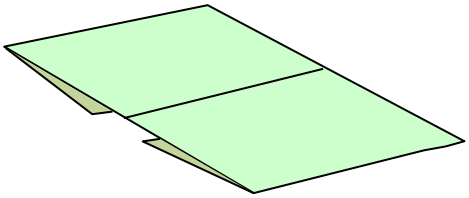
If feeding covers with windows, then a special design 'guide' must be fitted inside the window hole.



This guide will be provided by IBIS and made to fit exactly the size of the cut-out window hole.

10.8.4 Covers with Gate-Folds (winged covers)

Covers withgate-folds have an extra folded ‘flap’ on one or both sides which make them difficult, or in some cases impossible, to feed. These types of covers may contain 6 or 8 printed pages.



Check with IBIS first if wishing to run gate-fold covers.

10.8.5 Covers with ‘tear-off’ perforations

Some covers with ‘tear-off perforations may be run depending on the type and position of the perforations.

Check with IBIS first if you wish to run perforated covers

Note that an optional ‘dynamic’ micro-perforation system DMP-100 (see Appendix 11) is available for installation just before the Smart-binder folder. This may be used to automatically perforate covers (and/or content sheets) if not already pre-perforated.

10.8.6 Cover Code Reader (option BCR-105 or DCR-101)

To check that the correct cover (or insert sheet) is being fed onto each book, the optional code reading system (BCR-105 bar code reader or DCR-101 2D code reader) must be used (see Appendix 16). This compares bar coded ID numbers printed on each cover (or insert) with the code printed on the inside sheets and stops the system (or alerts the operator) if they do not match.

10.8.7 Feeding covers or inserts mixed with content sheets from the off-line pile feeder (Option SB-095)

Covers or inserts may be mixed with the content sheets and fed from the pile feeders SB-095, SB-096, SB-097, or from the printer if using a cut-sheet printer with multiple feed trays, instead of from the cover feeder CIF-100. In this case we recommend that the ratio between cover/insert stock weight and sheet stock weight is no more than about 2.5 :1.

10.9 BSS-10 and BSS-11 booklet or signature stacking

Booklets or signatures produced by the Smart-binder may be stacked into horizontal piles up to 330mm (13” high) using the BSS-10 or BSS-11 stackers. See appendix 9. The number of books in each pile is selectable by the machine operator. A turntable in the stacker enables books within each pile to be stacked in batches with spines in each batch in the opposite direction to the spines in the next batch. This ensures pile stability by avoiding all the spines being on the same side.

Book piles are delivered onto a free running roller table where they accumulate until removed by the operator. An in-line (or off-line) pile ‘strapper’ PS-100 is also available: see Appendix 29.

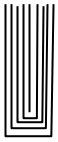
The BSS-10 stacker may be fitting with Option SBCR which provides a bar code reader and additional controller for 'intelligent' stacking. This may be used, for example, to process signatures into 'book blocks' for in-line or manual feed into the optional in-line perfect binder PB-600B or PB-1500W (SB-4 or SB-5 system).

10.10 BSS-20 and BSS-30 booklet or signature stacking

The BSS-30 'Alpha' stacker may be selected if book blocks need to be produced for perfect binding. This stacker has the option to apply glue between adjacent sigs to ensure the book blocks stays in register when being transported to the binder clamps. It also includes the option for auto, atci reject of any 'bad' book block stack.

10.11 Booklet Spine squaring

The Optional SM-101 or ARSD-S spine squarers (see appendices 20 and 21) may be attached to the end of the Smart-binder book delivery conveyor to press the normal booklet 'V' shaped spine into a 'square' shape:



Note: because of individual sheet folding, books produced by the Smart-binder do already lie very flat (particularly if ISG cold-glued) and there may not therefore be any significant improvement in flatness after spine-squaring. In fact, spine squaring does not give a good result on ISG glue bound booklets because the glue makes the spine more difficult to deform into a square shape. It is recommended therefore that spine-squaring is only applied to wire-stitched booklets.

The SM-101 may restrict the Smart-binder running speed and maximum booklet thickness if used in-line.

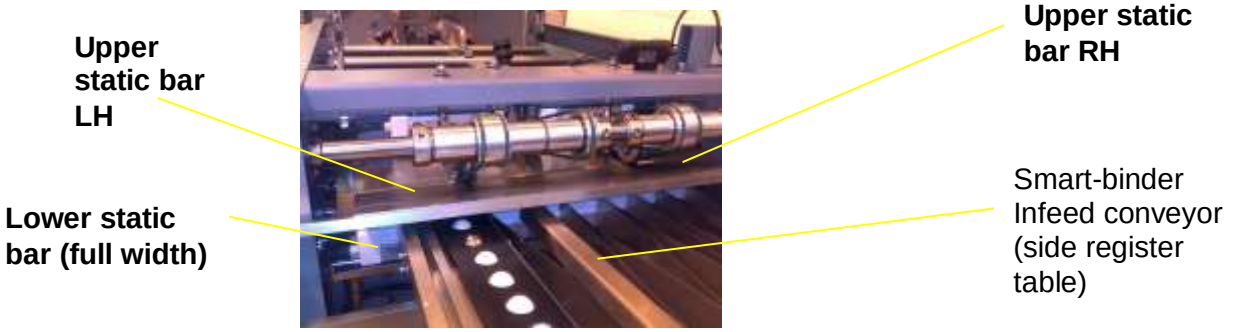
10.12 Using Pile Loading systems

The pile-loading systems PLT-100 or HPL-100 may be used to reduce the time needed to load the off-line version Smart-binder (SB-095 feeder), or the SB-097 feeder used as part of a near-line or in-line system. See Appendices 6 and 8 for details.

Pile reload times may be reduced from about 3-5 minutes to about 35 secs, resulting in approximately 10% improvement in system output.

10.13 Dealing with 'Static' electrical charge on the sheets

The Smart-binder has anti-static systems fitted just prior to the scoring module and above the sheet collector (see below). However, it is important that anti-static devices are also fitted in all upstream equipment to minimize static charge on the sheets entering the Smart-binder.



10.14 Document Edge Sealing DES-100

The Document Edge Sealing system DES-100 may be installed in-line with the Smart-binder delivery. This applies glue to the cover over-lapto seal closed the booklet foredge. This can be of value for high-security print applications such as examination paper production. Refer to IBIS for further details.

10.15 Using the SBS-100 sheet buffer

When running in-line with a web printer, the SBS-100 buffer system may be inserted in between the web cutter and the Smart-binder. This can allow a small proportion of very thin booklets (mixed with thicker booklets) to be produced without slowing down the printer. Without a web buffer the printer would have to run at a slow web speed dictated by the thinnest booklet in the mixed-pagination job.

A further benefit of the SBS-100 sheet buffer system is that the Smart-binder may be stopped for a short time without stopping the printer. See appendix 10

10.16 Smart-binder Production Speeds

10.16.1 Sheet infeed rates

10.16.1.1 Production in-line with a Digital printer or 'near-line from a pre-printed roll

When running in-line with a digital web printer (or pre-printed roll), the sheet arrival rate depends on web velocity and sheet cut-off dimension. The Smart-binder 'PLUS HS' model allows for operation in-line with printers or near line from an unwinder/cutter at up to around 130- 150 meters/min (426–492 feet/min) web speed.

If higher speeds are needed then each 'sheet' may be folded using an in-line cross-folder (F-100, F-101, F-200, or RF-100: see Appendices 13, 14 and 30) to contain 8 pages (or 12 pages) instead of 4 pages. In this case a web speed of 180meters/min (590 ft/min), or faster, is possible. Our experience to date (as of March 2021) is with webs operating at up to around 150meters/min (500 feet/min)

Note on production speeds when making very thin booklets: When producing 8-page booklets (excluding separately-fed cover), the maximum sheet infeed rate is reduced to about 232 x 4-page sheets/minute (or 116 x 8-page pre-folded sheets/min if using the optional cross-folder), in order not to exceed the maximum Smart-binder PLUS speed of 116 booklets/min (7,000 books/hour).

10.16.2 Booklet Production Rates: A4 saddle-bound books (no separately-fed cover)

10.16.2.1 Performance calculation when running from a web cutter

When running from a web cutter and producing booklets 1-up, then the booklet production rate can be calculated as follows:

$$\text{Booklets/minute} = \frac{\text{Web speed in meters/min}}{\text{Sheet length (in meters) x number of sheets in booklet}}$$

For example: If a 450mm web is running at 100 m/min and the sheets are cut to 450 x 307mm then 6-sheet booklets (24 printed pages) will be produced at a rate of:

$$\frac{100}{0.307 \times 6} = 54.3 \text{ booklets/min}$$

This calculation applies unless the production output rate exceeds 116 booklets/min., in which case the web speed must be reduced to avoid exceeding this Smart-binder's maximum speed of 116 booklets/min.

10.16.2.2 Performance calculation when running off-line from a sheet feeder

When running from a sheet pile feeder and producing booklets 1-up, then the booklet production rate can be calculated as follows:

$$\text{Booklets/minute} = \frac{\text{Sheet feeder rate (sheets/min)}}{\text{number of sheets in booklet}}$$

For example: If a the sheet feeder is set to feed sheets at 400 sheets/min. then 6-sheet booklets (24 printed pages) will be produced at a rate of:

$$\frac{400}{6} = 66.7 \text{ booklets/min}$$

This calculation applies unless the production rate exceeds 116 booklets/min., in which case the sheet feed rate must be reduced (to avoid exceeding the Smart-binder's maximum speed of 116 booklets/min)

10.16.2.3 Notes on booklet production rates

- The preceding calculation is for one-up production. Two-up production (running with center knife) will double the book output rate.
- Page throughputs may be increased if using a cross-folder directly prior to the Smart-binder (providing the maximum output of 116 books/min is not exceeded). In this case each sheet entering the Smart-binder infeed will contain 8-pages (or 12 pages) instead of 4-pages and production speeds. If 8-page increments are not acceptable then the selective folder F-200 is available to deliver a mixture of 8 and12-page signatures and thereby retain 4-page increments.
- When running with very light or difficult paper (for example: paper weights less than 60 gsm), then web speeds may have to be reduced, or the in-line F-100 folder may be used to avoid a web speed reduction.
- When running in line with a web printer, increasing web cut-off above 305mm (12") will decrease the book output rate for any given web velocity. An increase of 10% in cut-off will reduce book rate by 100/110 (9%). Similarly, a decrease of 10% of sheet cut- off will increase book rate by 100/90 (11%). At no time must the maximum book output rate of 116 books/min be exceeded (or 232 books/min if running 2-up with trimmer center-knife).
- On a CF web system, time is needed to change paper rolls periodically, and there may be system stops caused by the upstream printer and/or web cutter. When running off-line, then time is needed to load stacks of paper on the pile feeder. When book size changes, time is needed to adjust the Smart-binder (and often the upstream equipment

as well). These stops must be considered when estimating production capacity. Refer to IBIS for estimated Smart-binder operating efficiencies.

- System make-ready time for a change in booklet format size varies depends on circumstances and operator experience, but as a guide:
  - Smart-binder make-ready time for booklet format change – 5 minutes if stitch head positions do not need to be moved and 10 minutes if they do need to be moved.
  - Pile feeder loading (off-line operation only) – about 3 -5 minutes depending on pile height, or 35 secs if using PLT-100 or HPL-100 pile loading systems. Loading may be required every 5,000-8,000 sheets depending on sheet thickness
- When using ISG gluing and feeding a separately-printed cover sheet, then the output rate may have to be reduced to allow sufficient space to feed a cover in between the last sheet of one booklet and the first sheet of the next booklets.
- The optional SM-101 spine squaring module reduces the maximum output rate, if used in-line with the Smart-binder (see Appendix 20).
- The maximum production rate of perfect bound books using the PB- 600B perfect binder (SB-4B or SB-5B only) is 400-600 books/hour depending on book thickness and required bind quality. The higher-speed 5-clamp PB1500W perfect binder has a maximum book output rate of 1,500 books/hour.

10.17 Booklet finished Format sizes

10.17.1 Standard Smart-binder booklet sizes

Typical booklets that can be produced on the **standard Smart-binder SB-2 and SB-3** include the following sizes:

Size	**Metric dimensions (mm)** (Spine length x width)	**Inch Dimensions** (Spine length x width)
A4 (1 up)	297 x 210	
A5 Portrait (1 up)	210 x 148	
A5 landscape (2-up only)	148 x 210	
A6 landscape (2-up only)	105 x 148	
CD booklet (2-up only)	120 x 120	
US Letter size (1-up)		8 1/2 x 11
US Digest size (1-up)		5 1/2x 8 1/2
US Digest Oblong (2-up only)		8 1/2 x 5.5
US Oblong (1/4 letter) (2-up only)		5 1/2 x 4 1/4

Notes:

2-up production required optional trimmer center-knife and may require additional wire stitch heads.

Sizes outside the above range may be produced: Refer to Smart-binder specifications. Booklets with finished spine lengths in between 150 and 200mm (5 7/8 and 7 7/8") must be produced 2-up using the stretched model SB-XW (see below).

10.17.2 Producing small format booklets using the TUSDC-100 sheet direction-change modules

By slitting the web down the middle, producing two sheets side-by-side, and then changing the direction of both sheets by90-degrees before they enter the Smart-binder, it is possible to produce smaller format booklets (such as A5 or 5 ½ x 8 ½") in 4-page increments. The disadvantage of this configuration is that all sheets must be direction changed so it does not allow the production of larger format booklets. See Appendix 21

10.17.3 Producing small format booklets using the RF-100 rotator folder

By rotating each sheet90-degrees and buckle-folding each sheet in half before it enters the Smart-binder, it is possible to produce smaller format booklets (such as A5 or 5 ½ x 8 ½") in 8-page increments. The advantage of this method is that the rotate and fold processes can be easily deactivated to allow large sheets to flow into the Smart-binder without rotation or folding: hence both small and large format booklets can be produced. The disadvantage of this method is that booklets must contain increments of 8-pages and the additional bulk of the head-folds prior to trimming reduces the maximum number of pages in the finished booklet. See Appendix 14

10.17.4 Stretched model Smart-binder booklet sizes:

The extended model **Smart-binder SB-XW** can produce booklets larger than the normal Smart-binder maximums, or it can produce A5 (or 5 ½ x 8 ½") portrait format booklets 2-up (using the optional trimmer center-knife):

Size	**Metric dimensions (mm)** (Spine length x width)	**Inch Dimensions** (Spine length x width)
SB-XW maximum size	457 x 273 (less trim-off)	18 x 10.75 (less trim off)

10.17.5 Producing small format booklets

The minimum booklet spine length may be reduced from 200 to 95mm by using the trimmer center-knife CKN-101 and running 2-up (see Appendix 15). In addition to this, modification (option SBT-100) may be made to the Smart-binder to reduce the normal minimum sheet width from 250mm to (about 180mm) and to reduce the trimmed booklet width from 119mm to 82.5mm. This SBT-100 modification requires a change to the trimmer transport system and knife castings and can only be done at the IBIS UK factory.

11 Smart-binder 'Plus HS' Specifications

Maximum input speed (when fed from a web cutter)

Without additional F-100/F101 buckle folder	**With additional F-100/F101/F-200 buckle folder**
130 -150meters/min (422 ½ - 487 ½ ft/min) bBooks are made from an integral number of 4-page sheets *Note: exact maximum speed is determined by paper weight, paper stock quality and other external factors*	180 meters/min (585 ft/min) Books are made from an integral number of 8-page sheets if using F-100 or F-101

Maximum input speed (off-line operation from a sheet pile feeder)

Without extra option F-100/F101 buckle folder	**With extra option F-100/F101 buckle folder feeding 8-page sheets**
Approximately 400 4-page sheets/min (1600 pages/min)	Approximately 300 x 8-page sheets/min (2400 pages/min)

Maximum book production output rate

Saddle -bound books	**Perfect bound books (SB-4 or SB-5 only)**
Maximum output rate (one-up) : **7,000 booklets /hour** Maximum output rate (two-up using center-knife): **14,000 booklets /hour** *Note: the special extended model SB-X has a reduced cycling rate of* ***5,500 cph (11,000 bks/hr in 2-up mode)***	Using PB-600B: **400-600 books/hour (one up)**
	Using PB-1500W **1,500 books/hour (one up)**

Smart-binder SB: Input sheet sizes

Sheet Input Size	**Leading edge (long edge)**	**Width (short edge)**
Maximum	464mm (18 ¼")	320mm (12 $^{9}/_{16}$")
Minimum	250mm (9 ⅞")	210mm (8")

The size of sheets being fed into the Smart-binder should not vary by more than 0.5mm (0.020") during running. The fold line must not be more than 232mm (9 ⅛") or less than 105mm (4") from either side edge.

Smart-binder SB-XW 'extended model': Input sheet sizes

Sheet Input Size	**Leading edge (long edge)**	**Width (short edge)**
Maximum	546mm (21 1/2")	457mm (18")
Minimum	250mm (9 ⅞")	210mm (8 1/4")

The size of sheets being fed into the Smart-binder should not vary by more than 0.5mm (0.020") during running. The fold line must not be more than 273mm or less than 105mm from either side edge

Smart-binder with additional small format modifications

Sheet Input Size	**Leading edge (long edge)**	**Width (short edge)**
Maximum	464mm (18 ¼")	320mm (12 $^{9}/_{16}$")
Minimum	180mm (71/16")	210mm (8 1/4")

Cover Sizes (for saddle-binding only) SB-2 or SB-3

Cover input size	**Leading edge (long edge)**	**Side edge (short edge)**

Maximum	464mm (18 ¼”)	320mm (12 $^{9}/_{16}$”)
Minimum	250mm (9 ⅞”)	210mm (8”)

The cover should be the same length as the sheet to ensure that it is consistently registered along the spine. Cover size should not vary by more than 0.5mm whilst running. The cover fold line must not be more than 232mm (9 ⅛”) or less than 105mm (4”) from either side edge.

Use of the optional CAL-101 cover autoloader may reduce the maximum cover width (leading edge).

Standard Smart-binder Finished Book Sizes (saddle-bound booklets after 3-side trimming)

Description	Spine length	Spine to Fore-edge book width
Maximum	320mm (12 5/8’’)	225mm (8 13/16”)
Minimum	** 210mm (8”)	* 119mm (4 11/16”)
***Maximum when using 6.35mm (1/4”) center trim-out knife	157mm (6 3/16”) each book (thin books only)	225mm (8 13/16”)
***Minimum when using 6.35mm (1/4”) center trim-out knife	102mm (4”) each book (thin books only)	119mm (4 11/16”) (thin books only)

*** Book spine lengths between 157 and 210mm must be produced 2-up using the SB-X*

**** Center trimming cannot be used when making perfect bound books using the in-line connected PB-600 or PB-1500 perfect binders.*

Smart-binder SB-XW ‘Extended model’: Finished Book Sizes (saddle-bound booklets after 3-side trimming)

Description	Spine length (X stretch)	Spine to Fore-edge book width (W stretch)
Maximum	457mm (18”) less trim off	273m (10 ¾”) less trim off
Minimum	200 (7 7/8”)	119mm (4 11/16”)

Smart-binder SB-2 or SB-3 with Small format booklet modifications option SBT-100 (Saddle-bound booklets after trimming)

Description	Spine length	Spine to Fore-edge book width
Maximum	320mm (12 5/8’’)	225mm (8 13/16”)
Minimum	200 (7 7/8”)	82.5mm (3 1/4”)

Trim off (saddle-bound books only)

	Maximum	Minimum
Front Knife and Side knife trim off	*Before April 07:* 20mm (3/4") on all three side *From April 07:* Front knife 27mm (1 1/16) Side knife 20mm (3/4")	0mm *
Center knife trim out	6.35mm or 9.525mm (¼" or ⅜") (other sizes by special quote).	0mm

***Note:** A trim off between 0 and3mm (1/8") (1/8") is not recommended.*

Book Thickness

	Maximum	Minimum
Without center-knife installed	10mm (⅜")	1 sheet =Approximately 0.2 mm (.008")
With center-knife installed	10mm with no trim-out (split only) 3mm (⅛") for 6.35mm (¼") trim-out 4.5mm ($^3/_{16}$") for 9.525mm (⅜") trim-out	2 sheets =Approximately 0.4 mm ($^1/_{64}$")
When making perfect bound books (SB-4 or SB-5)	70mm	Approximately 3mm (1/8") (0.12"): perfect bound

Paper Weight Specification

Description	Paper stock weight	Cover stock weight
Maximum	160 gsm / 108lb offset / 43lb bond	230 gsm / 154lb offset / 61lb bond **
Minimum (without F-10 pre-folder)	50 gsm / 34lb offset/ 13lb bond *, providing grain is parallel to spine.	70 gsm / 47lb offset / 19lb bond
Minimum (<u>with</u> F-100 pre-folder model)	40 gsm / 27lb offset/ 11lbs bond * providing grain is parallel to spine	70 gsm / 47lb offset / 19lb bond

** Note: The minimum paper weights quoted above assume that the paper grain direction is <u>parallel</u> to the finished book spine. If the grain direction is perpendicular to the book spine (i.e. perpendicular to the direction of sheets entering the Smart-binder), then the minimum paper stack weights may be slightly increased. Weights below 60 gsm may require the running speed to be reduced. Weights below 60 gsm are not recommended when sheet rotating (see Appendix 14) or using the TUSDC direction-change modules (see Appendix 24).*

*'** Note: refer to IBIS if wanting to run covers heavier than 230 gsm to confirm suitability.*

Wire-stitch specifications

Description	Maximum	Minimum
Wire Stitches using 43/6-S head	Maximum stitch thickness: 6mm (0.2”) Maximum booklet thickness: 7-8mm (0.27 - 0.31”) Up to 4 stitches per book. (refer to IBIS if 6 stitches are required) 12mm flat stitch, 0.4mm to 0.6mm (0.016 to 0.024”) diameter round wire. Optional 12mm loop stitch	Minimum stitch spacing (43/6 head) = 43mm (1.89”) center-line to center-line. *Note: minimum spacing is when making a 2-sheet booklet and increases with book thickness.*
Wire Stitches using 52/8-S head	Maximum stitch thickness: 8mm (0.31”) Maximum booklet thickness: 10mm (0.4”) Up to 4 stitches per book. (refer to IBIS if 6 stitches are required) 14mm flat stitch, 0.4mm to 0.6mm (0.016 to 0.024”) diameter round wire. Optional 14mm loop stitch	Minimum stitch spacing (52/8 head) = 52mm (2.05”) center-line to center-line. *Note: minimum spacing is when making a 2-sheet booklet and increases with book thickness.*

Glue specification

Description	Glue type	Application
ISG cold glue	Pafra PVA cold glue AQUAPAL 9278 (sold also by Robatech as R-5183L50)	Glue dots along the inside of each sheet fold. Size and spacing of dots is variable from the SB operator I/F
Hot-melt glue (for Sprint-binder)	EVA hot melt (refer to IBS for recommended specification)	Layer approximately 0.5 mm thick on book spine + thinner layer on book sides.
PUR glue option (for Sprint-binder)	PUR Polyurethane reactive (refer to IBS for recommended specification)	Customer to determine appropriate glue film thickness.

11.1 Rotator/folder RF-100 Specifications

Performance:

Speed: Approximately 300 sheets/min

Note: speed must be adjusted to provide sufficient gap between sheets for turning

Sheet sizes

Max. sheet size: width 463.5mm x length 317.5mm (18¼“ x 12½”)

Min. sheet size: width 297mm x length 210mm (11“ x 8 ½”)

Maximum Fold lengths:

Fold plate I: 465 mm (18 $^{15}/_{16}$")

Fold plate II to IV: 385 mm (15 $^{5}/_{32}$")

Minimum Fold lengths:

Fold plate I to IV: 35 mm (1 $^{3}/_{8}$")

Number of fold plates: 4

Infeed and delivery heights.

Infeed Height: 1060mm (41 ¾”) plus or minus 50mm (2”) (adjustable)

Delivery Height: 80 –100mm (3 1/8 – 3 15/16”) lower than the infeed height

Paper weights:

From 80 gsm to 130 gsm *Note: 70 gsm upon request, test materials to be provided*.

Agency approvals:

CE Conformity

GS - Mark

11.2 BSS-10 and BSS-11 Stacker specifications

See Appendix 9

11.3 Spine squarer specifications

SM-101: See Appendix 20.

Important note: The maximum output rate from the SM-101 is 28 books/min and maximum book thickness (for high quality ‘squaring’) is about 3-4mm.

ARSD-S-100: See Appendix 21. Offers higher speed and/or thicker booklets

11.4 Sprint-binder PB- 600R (1-clamp) perfect binder specifications (when used as part of the SB-4 system and fed in-line from the SCF-100)

Maximum throughput rate: 600 books/hour (exact speed depends on book thickness and book quality requirements)

Maximum book size: 320 (spine) x 230mm (12 5/8 x 9 1/16”)

Minimum book size: 210 (spine) x 100mm (8 ¼ x 3 15/16”)

Maximum book thickness: 60mm (2 3/8”) (or 50mm (2”) if using optional in-line CMT trimmer)

Minimum book thickness:Approximately. 6mm (1/4”)(depending on paper weight and required finished book quality). Note: books thinner than 6mm (1/4”) require a different multi-zone conveyor at extra cost.

Paper weight: normal range 70 – 140 gsm

Glue temperature: 115 – 180 degrees C. (239 – 356 degrees F)

11.5 Sprint-binder 1500W (4-clamp) perfect binder specifications

- Number of clamps: 5
- Maximum speed: 1500 books/hour
- Maximum book size :
- Minimum book size :
- Book thickness range (compressed): 3- 60mm (1/8 – 2 3/8”)
- Power required
- In-line feed : yes
- PUR Option: yes (PUR Roller glue tank or PUR extruder available)
- Automated book size and thickness changes: yes (using servo motors and pneumatic controls).

11.6 CMT-130 trimmer specifications (per perfect bound books)

Minimum Book Size:	4" x 6" / 101.6 mm x 152.4 mm
Maximum Book Size:	9.5" x 13" / 241 mm x 330 mm
Maximum Book Thickness:	2" / 51 mm
Maximum Trim - Top:	6.0" / 152 mm
Maximum Trim - Bottom:	3.5" / 89 mm
Maximum Trim - Face	5.5" / 140 mm
Minimum Trim - All Sides:	0.100" / 2.5 mm
Speed	Up to 200 books per hour (single book) Up to 500 books per hour (multi-book)
Memory:	99 Book Jobs
Set-up Time for Book Size Change:	Approximately 10 Seconds

DIMENSIONS

Overall Height	60" / 1524 mm
Overall Width	52" / 1321 mm
Overall Length	57" / 1448 mm
Net Weight (Approximate)	1500 / 680 kg
Shipping Weight (Approximate)	1800 / 816 kg

Note: optional system is available to automatically control CMT-330 book size changes based on bar coded data on each book.

12 Configuration options for Smart-binders SB-1, SB-2 and SB-3

12.1 Common Configurations for fed from a web cutter

Key

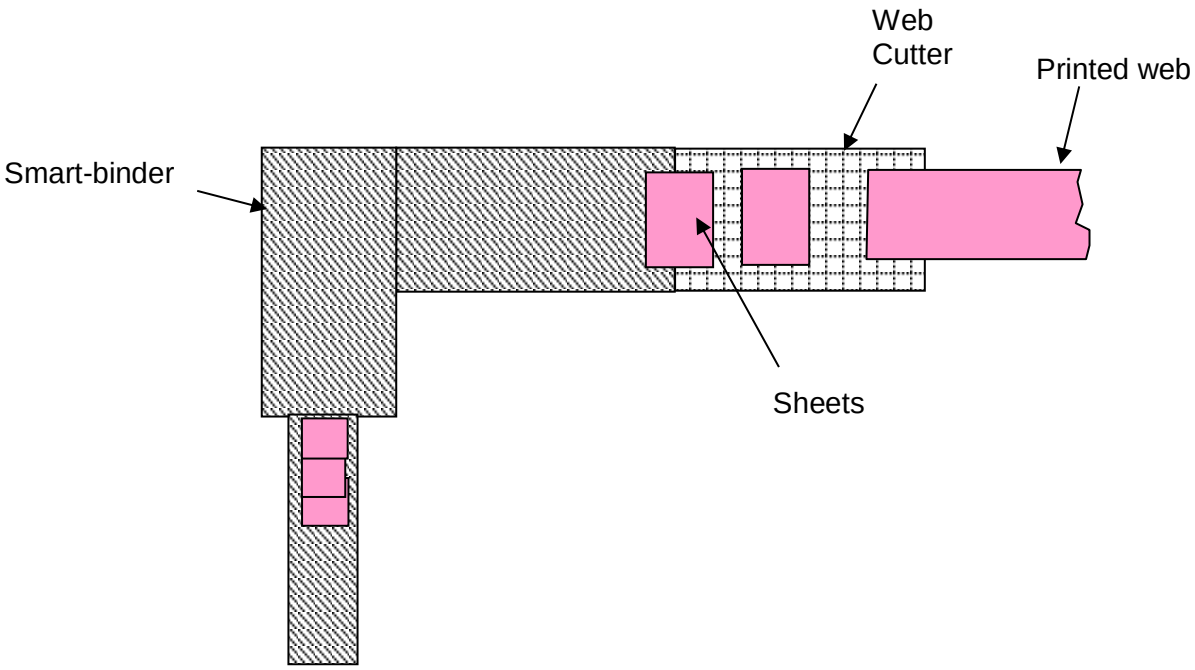
Standard Smart-binder

Smart-binder optional equipment

Equipment supplied by other manufacturers

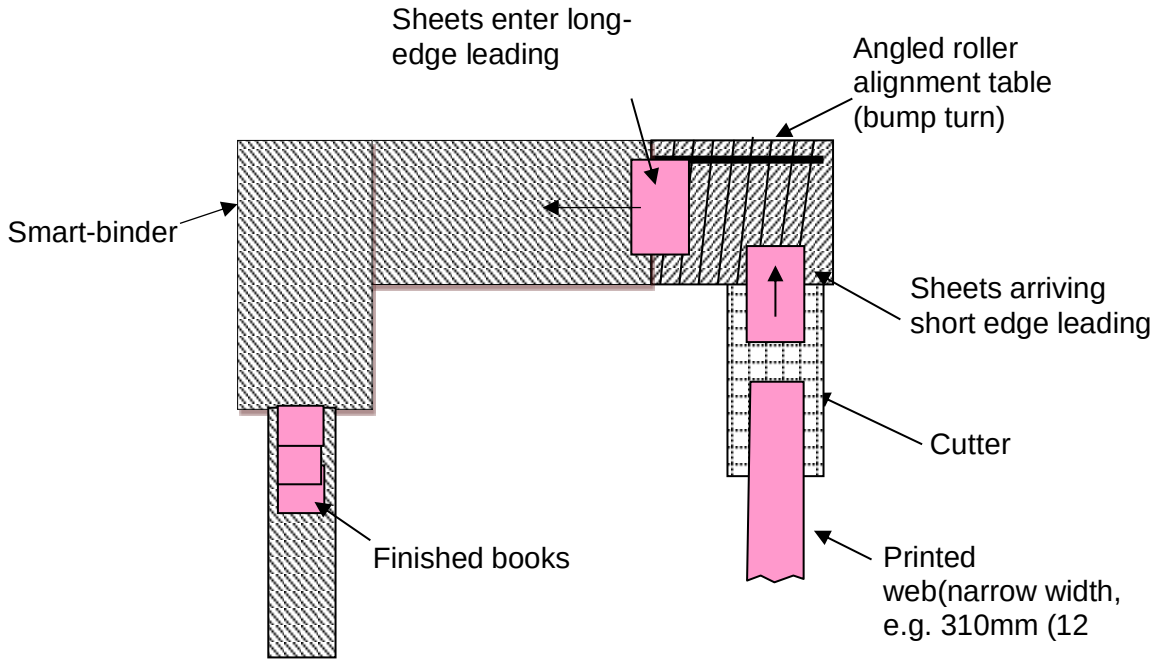
Sheets and Books

12.1.1 Normal configuration – feed directly from a web cutter



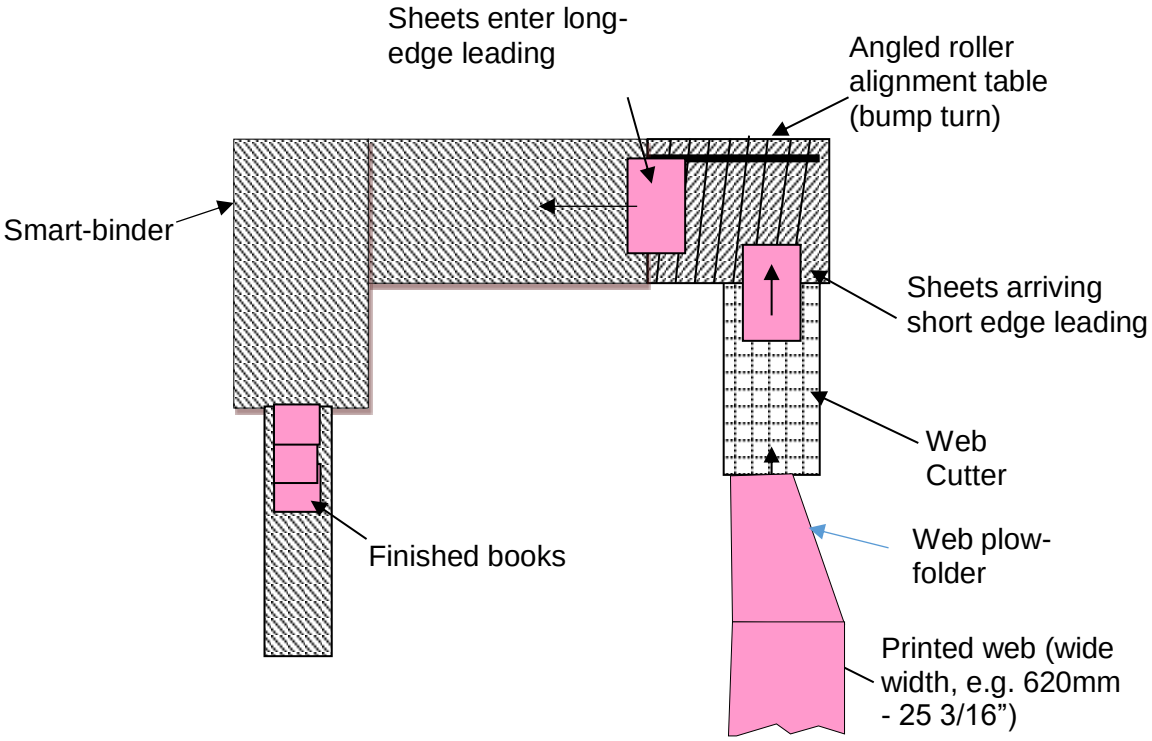
Advantages	Disadvantages
Simplest configuration will give the best system running efficiency (maximum up-time)	Small format books (e.g. A5) have to be made from a narrow web, which reduces the printer's efficiency.
	Narrow web-width printers can only make small format books.

12.1.2 Feed from a web cutter on the side - narrow web



Advantages	Disadvantages
Can make large (A4 & US letter) books in-line from a 'narrow' (e.g. 320mm (12 5/8") wide) web	Cannot make smaller (A5/Digest) sizes inline (except landscape/oblong sizes using trimmer centre-knife) .
A 320mm (12 5/8") web may be created but slitting a 640mm (25 3/16") wide web in half	Stocks lighter than 70 gsm may not reliably bump turn and any stock must be tested to verify that it can be handled in this way.
	The need to bump turn each sheet reduces the maximum web speed.

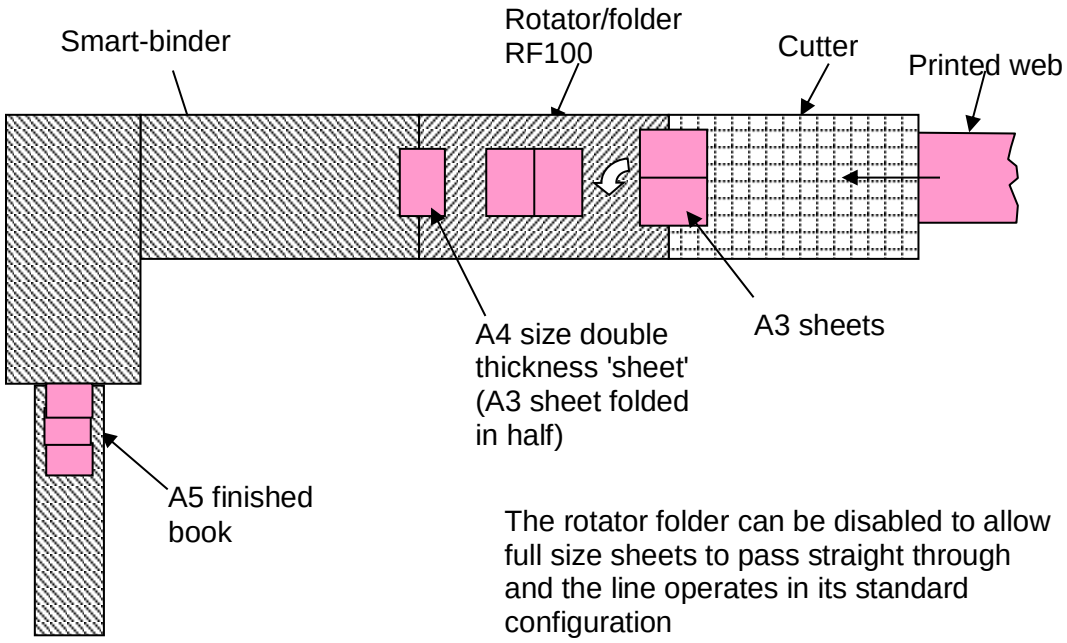
12.1.3 Feed from a web cutter on the side – wide web plow-folded in half



Advantages	Disadvantages
Can make A4 & US letter booklets using 620mm (25 3/16") wide web.	Cannot make smaller (A5/Digest) sizes inline (except landscape/oblong sizes using trimmer center-knife) .
The folded sheets are easier to bump turn than non-folded sheets	The need to bump turn each sheet may reduce the maximum printer web speed.

12.1.4 Feed from a web cutter via rotator/ folder to make small size books.

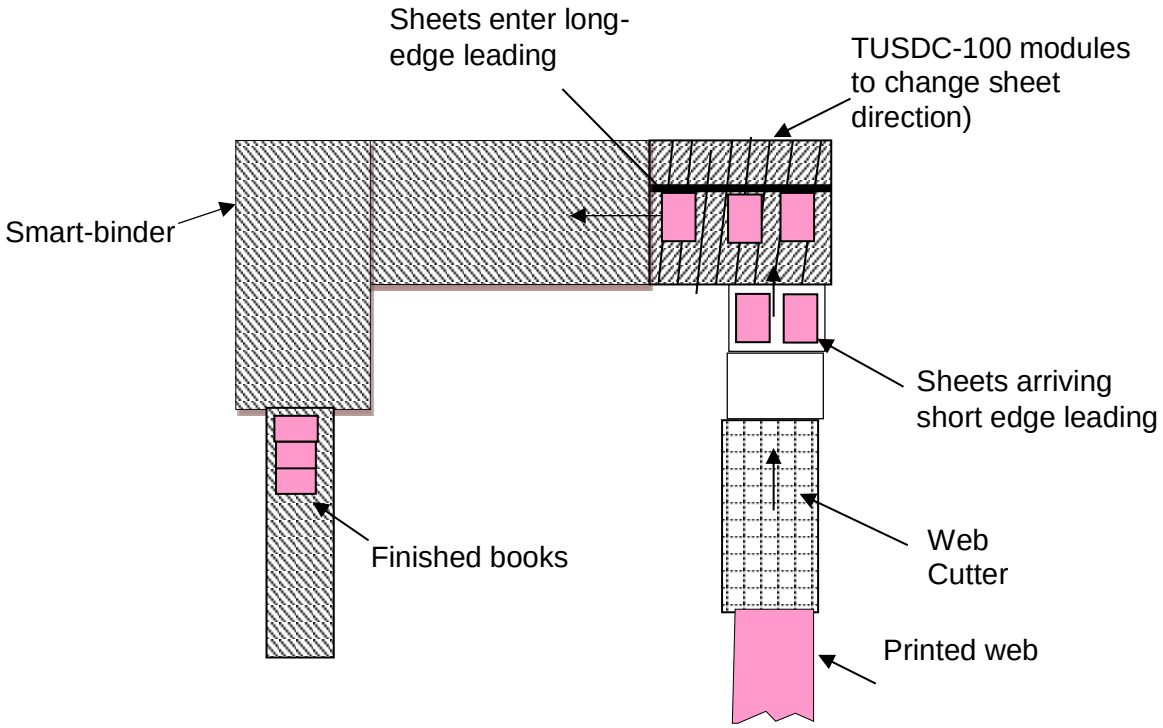
Example below shows A5 booklet production from a 450mm (17 11/16”) wide web



The rotator folder can be disabled to allow full size sheets to pass straight through and the line operates in its standard configuration

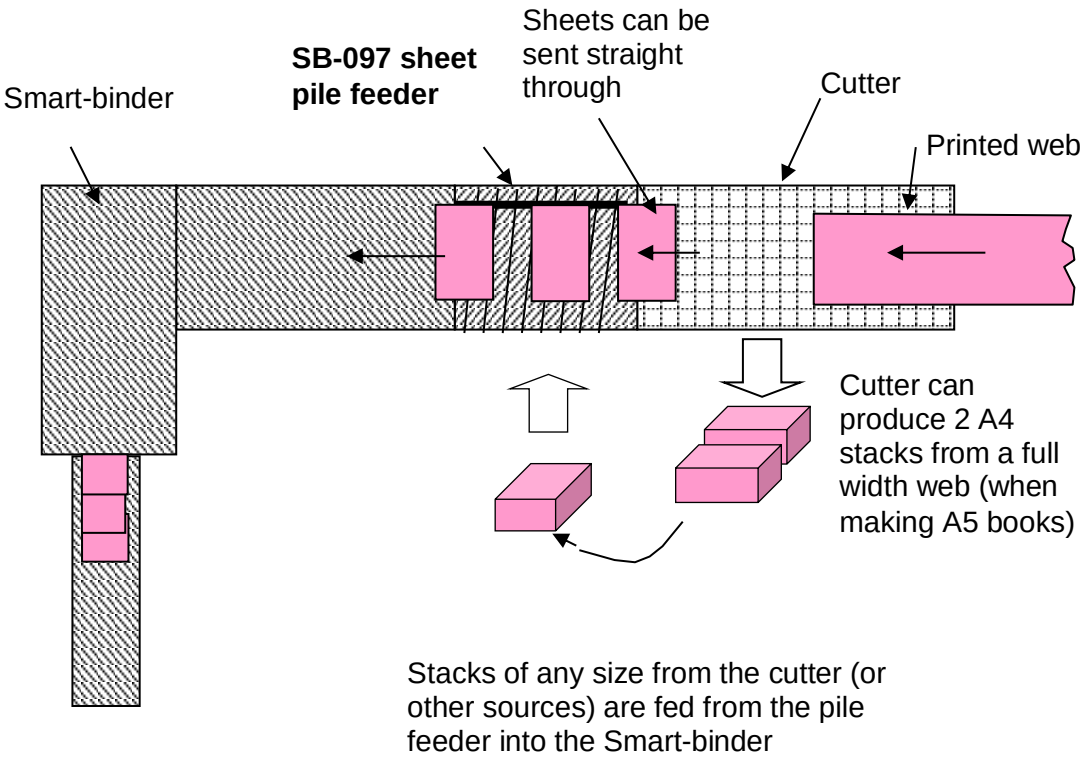
Advantages	Disadvantages
Can produce small size books (A5 / Digest) from same ‘wide’ web as larger books (A4 / Letter). This utilises the full print width and giving quicker changeovers between A4 and A5 by avoiding a web change.	Extra elements complicate the system and increase its cost.
	A5 Books must be made in increments of 8pp.
	The maximum thickness of the book made from folded sections is restricted because the folded edge tends to be thicker. The exact restriction depends on the behaviour of the stock in use.
	Additional anti-static measures may be needed.
	RF100 needs its own (additional) ISG glue system if wishing to make ISG glued books
	Sheets lighter than 60 gsm may not rotate reliably in the RF-100
	The RF-100 may not be used to rotate sheets at web speeds higher than about 90-100meters/min .

12.1.5 Feed from a web cutter on the side , web slit in half and TUSDC modules to change sheet direction



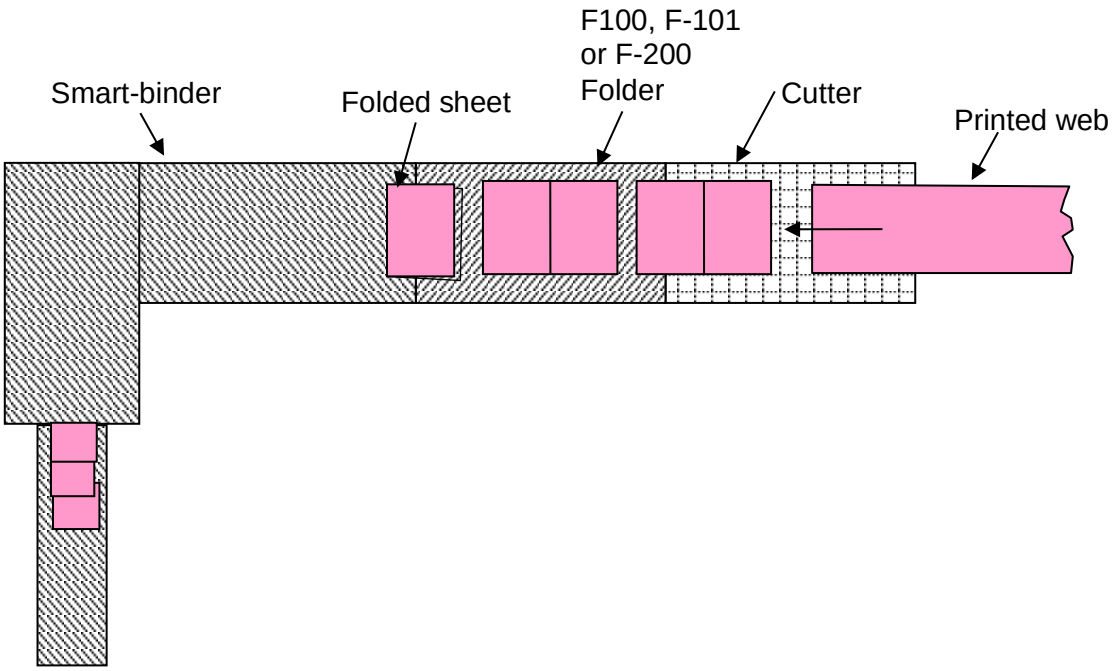
Advantages	Disadvantages
Can make A5 or 5 ½ x 8 ½" booklets from a 450mm or 18" wide web .	Cannot produce larger (A4 or 8 ½ x 11") booklets
Page numbers can be varied in 4-page increments	The need to bump turn sheets reduces the maximum web speed to about 60 m/min .
Sheets do not require pre-folding which make ISG gluing easier and allows maximum thickness booklets to be produced	

12.1.6 In-line / off-line configuration (using optional SB-097 feeder)



Advantages	Disadvantages
Can choose between feeding from piles of sheets or directly from a web cutter. Allows sheets to be fed which have come from more than one printer or from other sources.	Increases the length of the line slightly
Combines the benefits of in-line production for A4/letter sizes with the ability to switch rapidly to smaller sizes by stacking down and re-feeding.	Increases system cost
Avoids need for RF-100 rotator folder or TUSDC modules to produce small-format size booklets (e.g. A5). Allows books to be made in 4pp increments.	

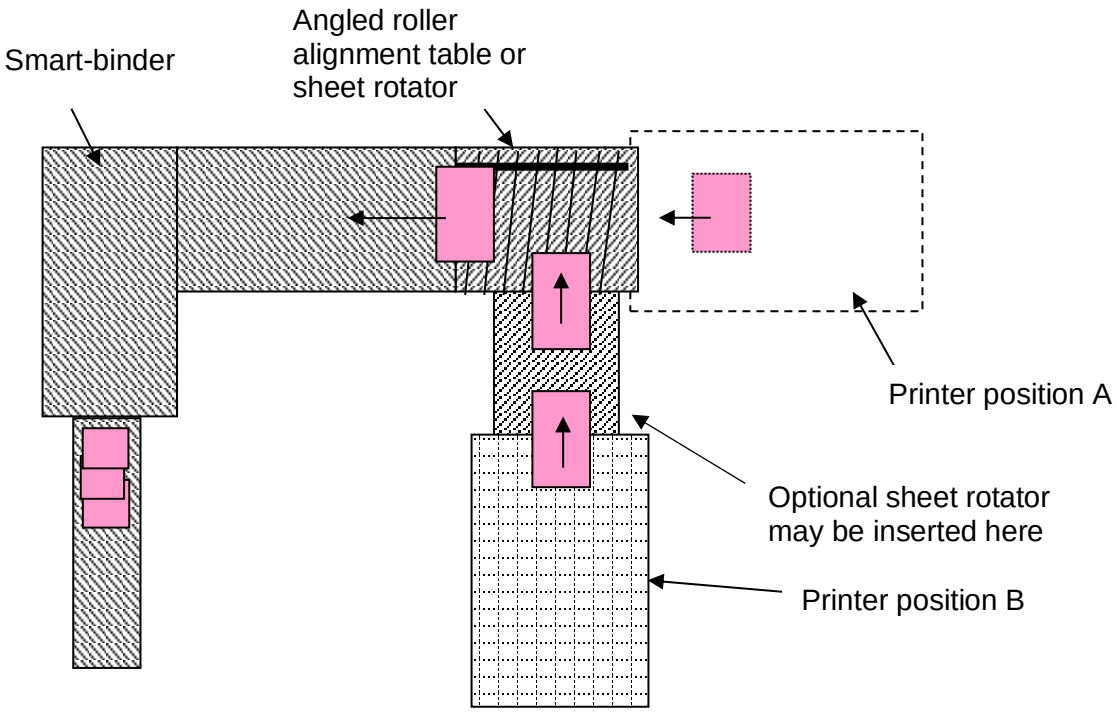
12.1.7 In-line with extra F-100 folder to allow higher web speeds or lighter paper stock



Advantages	Disadvantages
Assists use of lightweight (< 60 gsm) stocks, and Increases maximum web speed to approximately180 meters/minute	Increased cost and complexity of the line
	Can only make books in 8pp increments when folding (unless the 'selective' F-200 folder is used in which case 4pp increments are possible).
	The fold restricts the maximum thickness of the finished book. *
	Additional anti-static measures may be needed.
	The folder must have its own additional ISG glue system if making books with ISG cold-glue.

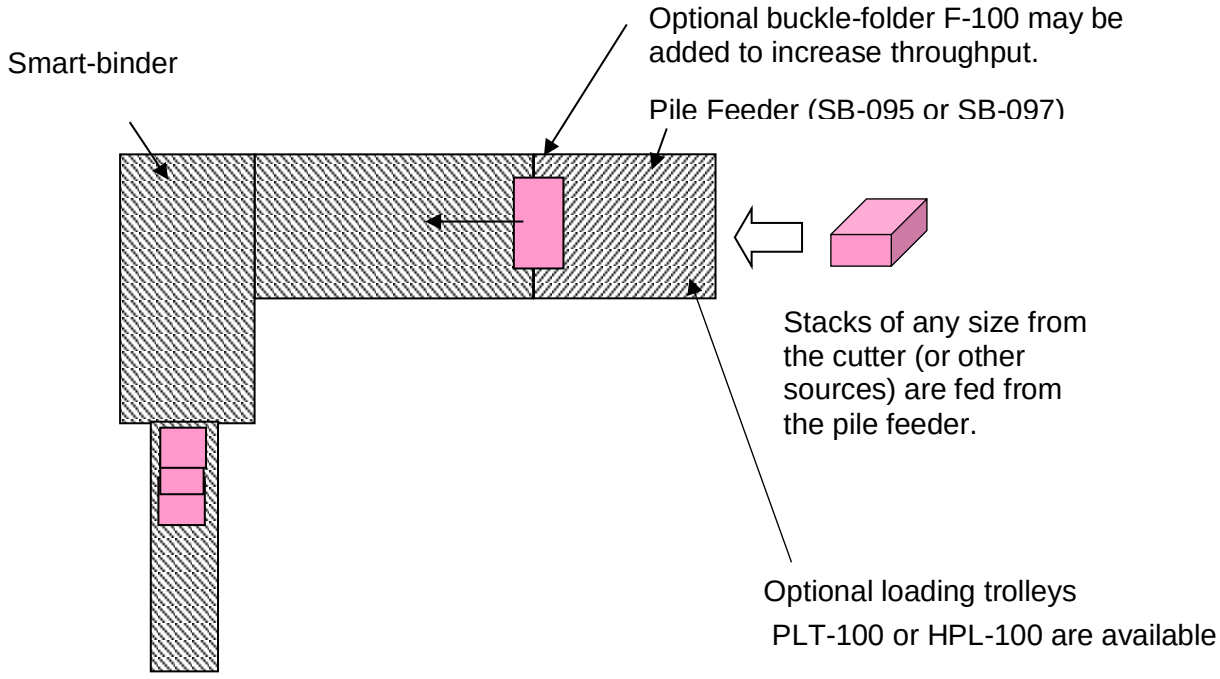
** Note:Maximum number of pages in the book may be restricted because the maximum specified thickness of10mm (3/8")) must be applied to the thickness of all the sheets together, measured at the thickest point: i.e., at the edge folds.*

12.1.8 In-line with a cut-sheet printer



Advantages	Disadvantages
In-line operation eliminates manual sheet handling.	Some booklet formats require sheet direction change and/or rotation
DFA/DFD link available with printer.	

12.2 Off-line operation from a pile feeder



Advantages	Disadvantages
Quick and simple size changes	Increases the amount of manual handling of the sheets.
Flexibility of feeding from piles of sheets, which can come from more than one printer or from other sources.	The piles must be turned over if the print order must be maintained during binding, however, in many cases the workflow can be planned to avoid this. If piles are turned over then a different impositioning scheme is needed.
Can run independently of the print line so improving overall output	Additional cost (for the feeder)
Can make small size books in 4pp increments	
Can easily pause sheet feed to allow center inserting etc.	
Allows small format booklets to be produced without needing to change to narrow web or use optional in-line RF-100 rotator/folder.	
Optional loading trolley PLT-100 available to speed up reloading of feeder	

12.3 Selecting whether to use the Smart-binder in-line, near-line, or off-line

12.3.1 Running the Smart-binder 'in-line' with a digital printer:

- Avoids manual handling of the sheets between the stacker and the Smart-binder.
- Minimises hardware cost (no re-winder, unwinder, stacker or sheet feeder needed).
- Minimises equipment floor-space requirement.
- Avoids the extra complexity, maintenance, make-ready time and system 'stop' time associated with rewinding the web or sheeting/stacking immediately after printing
- Avoids extra costs, complexity, maintenance, make-ready time and system 'stop' time associated with re-feeding sheets into the Smart-binder from the off-line pile feeder (needed for off-line operation).
- Delivers the first finished booklets within seconds of printing, compared with 'near line' production where a lot of time is lost rewinding the roll and then moving the roll to the finishing system, and 'off-line' production where some time is lost in stacking sheets and loading them into the sheet feeder.
- Maximizes sheet page sequence integrity (no intermediate sheet manual handling).
- Can make system start-up more difficult because all elements of the system have to start together without problem.
- More difficult to change book format sizes compared with off-line operation.

12.3.2 Running the Smart-binder 'near-line' from a pre-printed roll unwinder and cutter

- Avoids any potential system problems associated with sheeting the web immediately after printing (rewinding is more reliable than sheeting). Web rewinding allows maximum printer speed and efficiency (e.g., compared with sheeting/stacking after printing).
- Near line finishing introduces a time delay between printing and finishing, due to the need to produce a printed roll before it can be moved to the finishing system
- Rewinding onto a roll decreases the risk of losing sheet page sequence integrity. However book sequence is reversed because the first page on the roll is the last page to come off the roll when finishing.
- Extra time and operator input is needed to remove printed rolls from the unwinder, move these rolls to the finishing system and load these printed rolls onto the unwinder of the 'near-line' finishing system.
- It is more difficult to monitor and control print quality when the printed web goes straight onto a roll, compared with producing sheets immediately after printing.
- It is more difficult to change book format sizes compared with off-line operation.

12.3.3 Running the Smart-binder 'off-line' from a deep pile sheet feeder:

- If making frequent large changes in format sizes (e.g.: A4 – A5), then it may be easier/cheaper to run off-line from a sheet pile feeder. In-line or near-line production of small format books either requires the web width to be reduced (with associated loss of printer efficiency), or the use of an additional in-line folder with sheet rotator (option RF-

100). If running small book sizes off-line from sheets printed on a CF printer, then the printer web cutter can be set to produce stacks of smaller sized sheets (i.e.: using slit/merge facility) which may be loaded directly into the off-line Smart-binder sheet pile-feeder.

- An off-line Smart-binder can feed sheets faster than the speed at which sheets are printed on some printers (e.g. cut-sheet printers or many color printers). This means that one off-line Smart-binder can sometimes be used to finish the sheets produced by more than one printer.

- Running off-line gives the sheets time to cool and lose their static charge. This may sometimes improve sheet-collecting performance in the SB compared with in-line production.

- When producing small format sized books off-line, the need for folding (prior to the Smart-binder) can be avoided. Folding can sometimes limit the maximum book thickness due to the bulk of the extra head folds.

- When running off-line, then downtime in one part of the system (roll change, format change, etc.) does not affect the rest of the system.

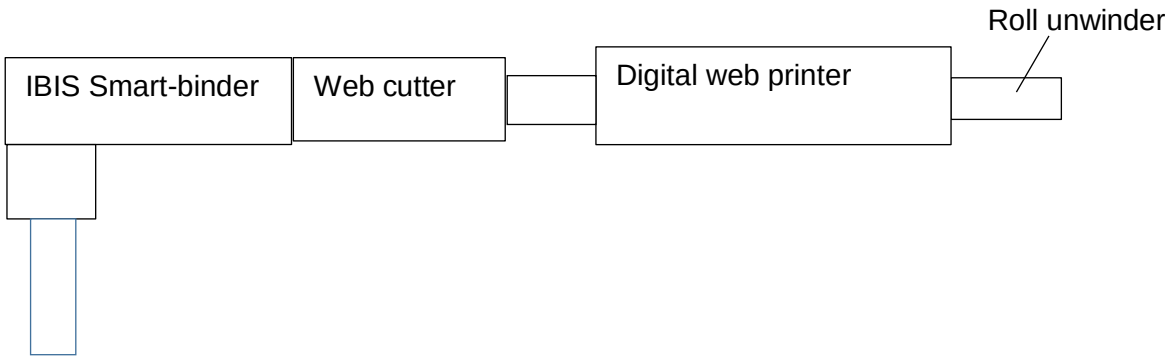
- Off-line operation allows the Smart-binder to be used to stitch one job while the printer prints a different job (that may not need stitching).
- Any extra gaps can be more easily created after the last sheet of each book if needed to feed covers from the cover feeder when using ISG cold-glue.
- Book sequence is lost because the drop stackers used on printers mean that the last sheet to be printed is on top of the pile. This sheet therefore becomes the first sheet to enter the Smart-binder (because the feeder feeds from the top of the pile). Book sequence can sometimes be important when printing personalised output. Sequence can be maintained only if the pile is turned over before finishing. The last book to be printed becomes the first book to be finished, unless the pile is turned over before loading into the Smart-binder pile feeder.
- Off-line operation requires an additional sheet stacker and sheet feeder and additional manual handling to move sheet piles between stacker and SB feeder. Note: optional pile handling trolley system PLT-100 is available to reduce reload time.
- The sheeter/stacker and deep pile feeder increase the overall risk of system stops and down-time.
- The manual handling of sheets increases the risk of losing page sequence integrity (although the use of bar codes on each sheet will detect this and prevent bad books being delivered by the SB).

12.3.4 In-line/ off-line configuration (Option SB-097)

- It is possible to configure the Smart-binder to be in-line with a digital printer, but also to have a sheet pile feeder, located in between the printer and the Smart-binder (option SB-097). This option is selected by many customers to enable jobs to be either run in-line or off-line, with quick changeover between the two modes. See appendix 7

12.3.5 Choosing between an in-line, near-line or off-line Smart-binder system

Finishing in-line with a digital web printer



Advantages:

- Booklets are produced within seconds after printing: no delays.
- Reduced number of operators needed: no intermediate paper handling required.
- Printed sheets are immediately converted into finished booklets which increases security and reduces risk of any data breach. This is particularly important for high security printing such as examination papers
- No additional roll re-winders or un-winders or sheet feeders are needed, so in-line is the lowest cost (hardware) solution

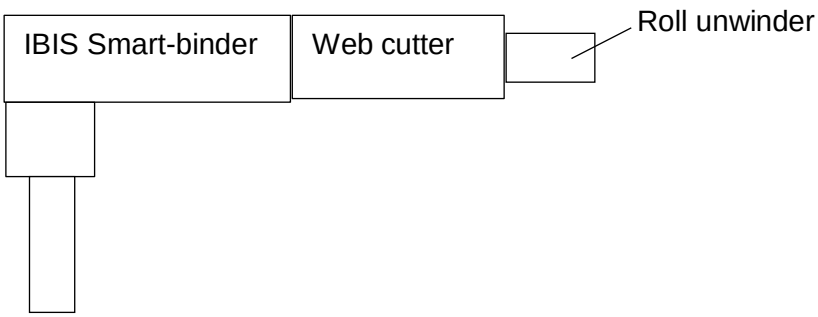
Disadvantages:

- Printer speed may have to be reduced when making very thin booklets (e.g: 8pp or 12pp?)
- Finishing directly from a web does not suit production of smaller format booklets since this requires web width to be reduced or, complex additional in line folding and/or sheet rotation.
- Printer efficiency will be slightly reduced because printer must stop if the finishing system stops.
- Some printers can take a few minutes to restart after a stop which reduces the finishing system efficiency

Summary:

In-line finishing is best suited to high security print applications where the booklet format size does not change and booklets must be produced immediately after printing

Finishing near-line from a roll un-winder and web cutter.



Advantages:

- The printer is free to run at full speed with maximum printing efficiency when printing roll to roll.
- The roll un-winder can be set at the optimum speed to suit the finishing system
- The system can be restarted quickly after a stop
- The finishing system can handle the output (rolls) from multiple printers
- Compared with off-line finishing (3/) , it is easier to manually move a printer roll every few hours compared with frequently moving small piles of sheets.

Disadvantages:

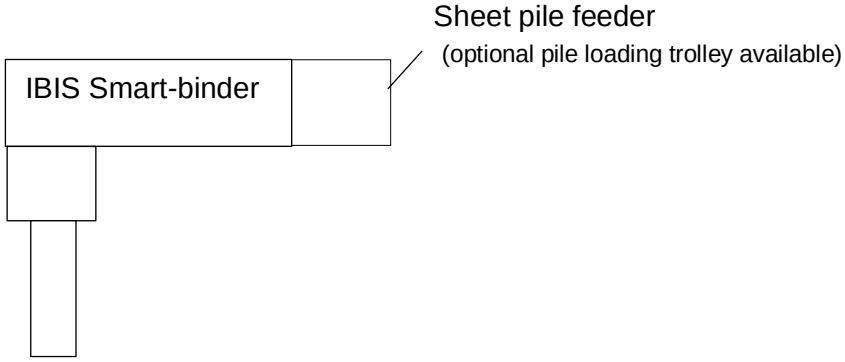
- It can take up to 2 hours for the printer to produce a printed roll which delays the finishing process
- An additional roll re-winder and un-winder are needed (extra cost compared with in-line finishing)
- Paper rolls have to be manually moved from the printer and loaded onto the finishing system roll un-winder.
- Finishing directly from a web does not suit production of smaller format booklets since this requires web width to be reduced or, complex additional in line folding and/or sheet rotation.

Summary:

Near-line finishing is best suited to applications requiring maximum possible system operating efficiency, and where there is not much variation in booklet format size.

Note: In-line or near-line Smart-binders may be fitted with the optional SB-097 sheet pile feederto offer also the benefits of feeding off-line, when needed.

Finishing off-line from sheet pile feeder



Advantages:

- Sheets may be easily cut to a smaller format size to allow production of smaller format booklets. Off-line operation is therefore recommended if a large range of different booklet formats are needed.
- The printer is free to run at full speed with increased printing efficiency.
- The sheet feed rate can be varied automatically to suit the number of pages in each booklet.
- Cover matching is easier when running off-line because the codes on the sheet and the corresponding cover for each book can be checked. Also it is easier to recover after a system stop.
- The system can be restarted quickly after a stop.

Disadvantages:

- The print line has to include a sheet stacker and the finishing line has to include a sheet feeder (additional cost compared with in-line finishing)
- The Smart-binder must be stopped to reload the sheet feeder which reduces production time and required additional manual paper handling.
- The sheet feeder will occasionally mis-feed which reduces the efficiency of the finishing operation.
- The sheet feeder requires additional operator skill and training.
- The reliability of sheet feeding will be reduced if the paper is light-weight or curled or contain too much static charge.

Summary:

Off-line finishing is best suited to production of a range of different format sized booklets and/or if booklets are personalised with matching covers.

13 Selecting upstream modules as part of an in-line system

(when the Smart-binder is running in-line with web printers or near-line from pre-printed roll)

13.1.1 Web Cutters

13.1.1.1 Cut-sheet length

The web cutter must give accurate sheet cut length, even when the system is accelerating or decelerating on system start-up or stop. Any inaccuracy in cut sheet length will be apparent in the finished book when checking the distance of the print to the trimmed edge. If the sheet is more than about 1mm too long then it may jam in the Smart-binder collector.

If there is any possibility that the cutter may produce incorrect length sheets then the cutter should be fitted with an automatic sheet reject gate. This reject gate may also be useful to reject a certain number of sheets every time the system starts up if there is a risk that these sheets may be unacceptably curled due to tensioner rollers in the cutter or festoon web buffer (see also paragraph below on sheet rejection) .

During system start-up and stopping, the time between each sheet and the next being delivered to the Smart-binder must not fall below about 220 milliseconds, otherwise a sheet jam in the Smart-binder collector may result.

Whilst running, any more than 1% variation in the distance between the trailing edge of one sheet and the trailing edge of the next sheet (as they are delivered to the Smart-binder) may cause synchronisation problems in the Smart-binder, particularly when producing very thin books (e.g.: 8 and 12 pages). Gradual, smooth changes in distance between one sheet and the next (i.e.: cutter speed) do not generally cause problems, provided the change between each sheet and the next is within 1%.

Special note: If choosing to use the ‘selective’ folder option F-200 (in order to run at high web speeds but make books with 4-page increments) then the web cutter must be able to vary sheet cut length on the run (to produce either 8-page sheets or 12-page sheets)

13.1.1.2 Cut sheet stack delivery (stacker)

If the web printer is to be used for producing loose cut sheets (for alternative finishing methods) then the web cutter will be fitted with a sheet stacker. The stacker must be fitted

with a bypass ‘transfer conveyor’ so that sheets can pass over the sheet stacker, without slipping or twisting,to enter the Smart-binder.

13.1.1.3 Sheet reject

The web cutter should be fitted with an automatic sheet reject which is programmed to reject the first sheets after each system start-up. These first sheets are often curled because they have been stationary and wrapped around rollers in the cutter/buffer etc. Rejecting these curled sheets on start-up reduces the risk of these sheets causing a paper jam in the Smart-binder. Some printers produce unprinted paper on start-up (and on stopping) and it is desirable to reject any unprinted sheets in the web cutter instead of passing these on to the Smart-binder.

13.1.1.4 Web buffers

A web accumulator (buffer) is often fitted between the printers and the cutter to allow the printers to continue running while a stack is being ejected from the stacker. When this is the case, the cutter may be set to run faster when there is more than a preset amount of paper in the buffer (note: the maximum speed of the cutter must be limited to avoid exceeding the maximum input speed of the Smart-binder) . When running with the Smart-binder, the buffer should be kept empty (i.e.: with the minimum amount of paper in it) and the cutter speed set to match the printer web speed. Stopping the line with excess paper in a web buffer always introduces curl into the paper in the buffer; this gives problems with sheet handling in the stacker and Smart-binder. If the buffer stops with paper web in it then the tension should be automatically released to reduce paper ‘curl’

13.1.1.5 Anti-static equipment for web cutters

Web cutters may need to be fitted with anti-static bars to, as far as possible, eliminate static charge on the sheets delivered to the Smart-binder. This is particularly important when running with lightweight paper.

13.1.1.6 Different types of Web Cutters

The following web cutters are recommended and approved for use with the Smart-binder: Hunkeler, Tecnau, Kern, EMT, Iram, Spedo and MBO.

13.1.2 Web Moisturiser.

A web moisturiser (such as the Weko RFDi) may be needed when running a Smart-binder in-line with a high-speed toner-based web printer at high-speed. This is because the printer heats and dries the paper web during the printing process.

The moisturiser is essential to put water back into the paper and thereby avoid static charge build-up which can cause problems in the finishing equipment

The web moisturiser is not normally used when running in-line with ink-jet printers because the paper is not heated to the same extent as toner printers.

14 Print impositioning schemes for Smart-binder booklet making

14.1 Example impositions

Key to impositioning schemes

	Side trim, removed by side knives, recommended range 3 to 15mm
	Front trim, removed first, recommended range 3 to 20mm. Note that more must be trimmed from thicker books to allow for the distance that the outer sheets must wrap around the spine of the book which causes the inner sheets to protrude further.
	Center trim, removed second if this option is used. The center knife removes 0mm, 6.35mm (¼") or 9.525mm (⅜") but may limit the book thickness.
	Fold line, produced either by buckle folding in an inline folder, or by the Smart-binder. The fold made by the Smart-binder is always the spine of the finished book
	Stitch, always shown as they appear on the outside of the sheet when it is in the Smart-binder.
	Register, the top left corner of the page in the finished book with the spine on the side (rather than on top - notebook style).
N	Number of sheets in book, the total number of sheets used to make the book, used in the page position calculation.
M	Sheet number, the position of this sheet in the book (sheet 1 arrives at the Smart-binder first), used in the page position calculation

In the tables below, printer 1 refers to the printer on which the lower side of the sheet is printed and printer 2 refers to the printer on which the upper side of the sheet, including barcode, is printed.

The diagrams are pictorially correct looking down from above onto the sheet as it enters the Smart-binder.

The barcode must always on the top face of the sheet as it enters the Smart-binder.

14.2 A4 or 8 ½ x 11" finished format size

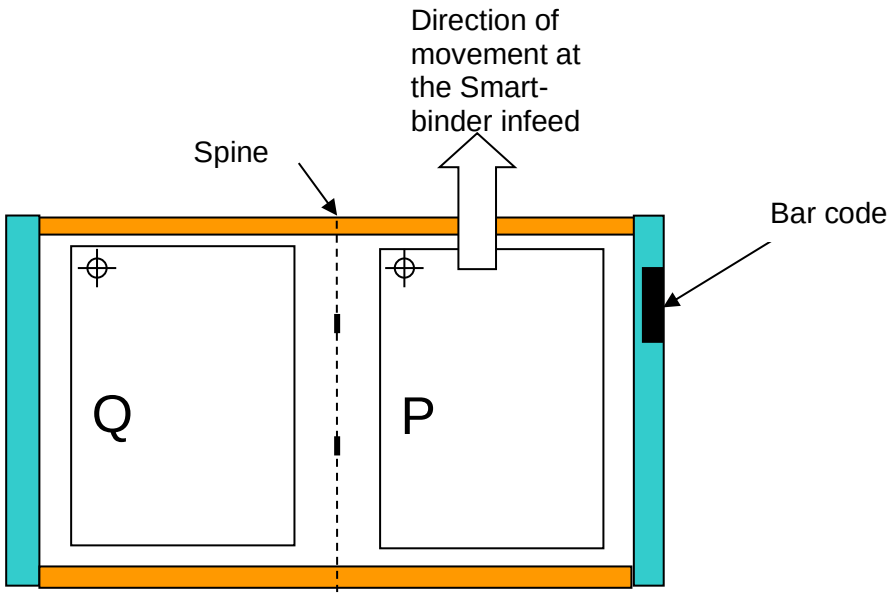
	A4 size (297 x 210mm)	Letter size (11 x 8½")
Web Width	430 – 460mm	17 ½ - 18 ¼"
Sheet cut length	305 – 320mm	11 ½" -12 ½"

A5 Portrait or Digest (8½ x 5½") without pre- folding

(From narrow web or pile feeder, without using folder before Smart-binder infeed.)

	A5 size (Portrait) 210 x 148mm	½ Letter size 8 ½ x 5 ½"
Web Width	310 – 340mm	11 ½ - 12 ½"
Sheet cut length	220 – 250mm	9 – 10"

Page impositioning for A4 / 8 ½ x 11" from wide web, or A5 / 5 ½ x 8 ½" portrait from 'narrow' web:



Page number	Printer 1	Printer 2
P	2*(*n*+*m*)-1	2*(*n*-*m*)+1
Q	2*(*n*-*m*)+2	2*(*n*+*m*)

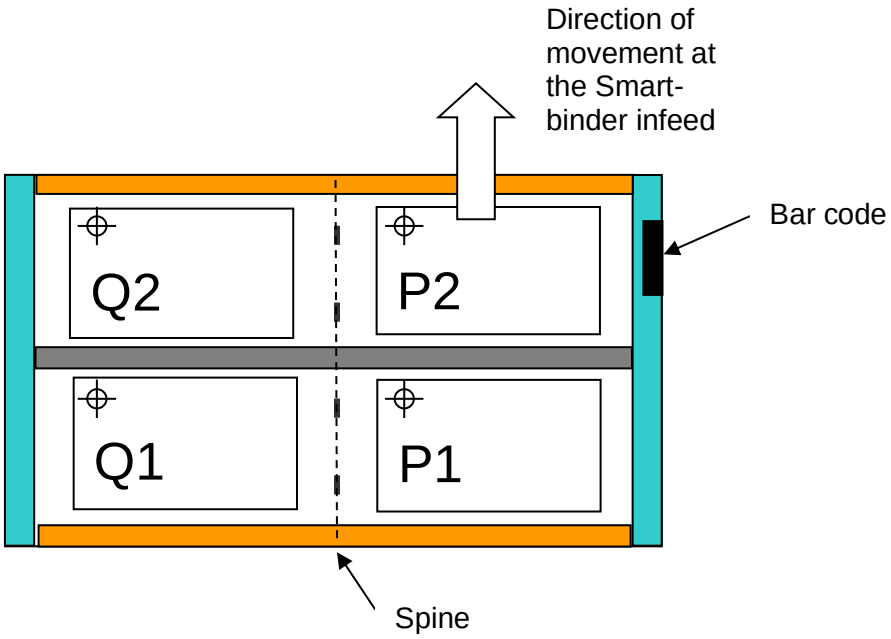
Note: It is assumed that Printer #1 prints on the under-side of the sheet and printer #2 prints on the upper side of the sheet

14.3 A5 landscape (or 8 ½ x 5 ½" oblong) finished size

	A5 size (Landscape) 148 x 210 mm	**½ letter size (oblong) 5 ½ x 8 ½"**
Web Width	430 – 460mm	17 ½ - 18 ¼"
Sheet cut length	310 – 320mm	11" –12 ½"

14.4 CD booklets (120mm square) from narrow web or pile feeder

	CD (120 x 120mm)
Web Width	250 - 280mm
Sheet cut length	250 - 280mm



Page number	**Printer 1**	**Printer 2**
P	2*(*n*+*m*)-1	2*(*n*-*m*)+1
Q	2*(*n*-*m*)+2	2*(*n*+*m*)

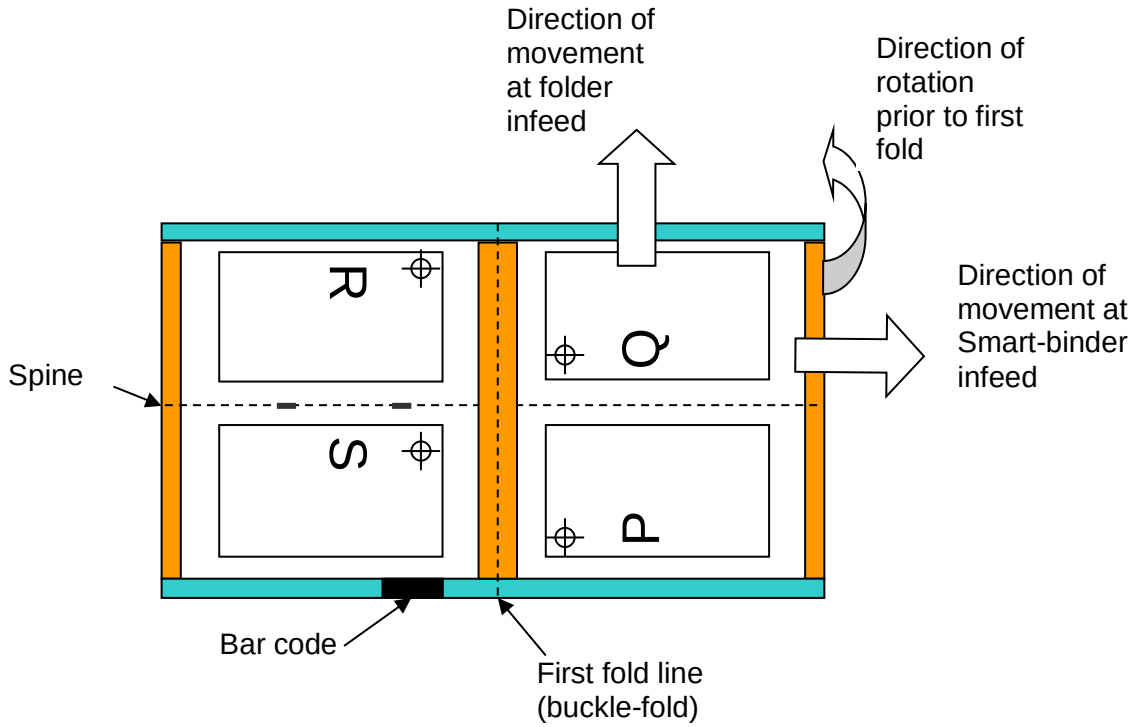
Note: Book 1 (P1 & Q1) is nearest the operator on the delivery conveyor.

Note: It is assumed that Printer #1 prints on the under-side of the sheet and printer #2 prints on the upper side of the sheet

14.5 A5 Portrait (or 8 ½ x 5 ½") finished size using RF-100

To produce smaller sizes books from a full width web using the RF-100 in-line rotator folder. This scheme applies when the leading section of the sheet is folded down in the folder.

	A5 size (Portrait) 210 x 148mm	**½ letter size 8 ½ x 5 ½"**
Web Width	430 – 460mm	17 ½ - 18 ¼"
Sheet cut length	305 – 320mm	11 ½" – 12 ½"

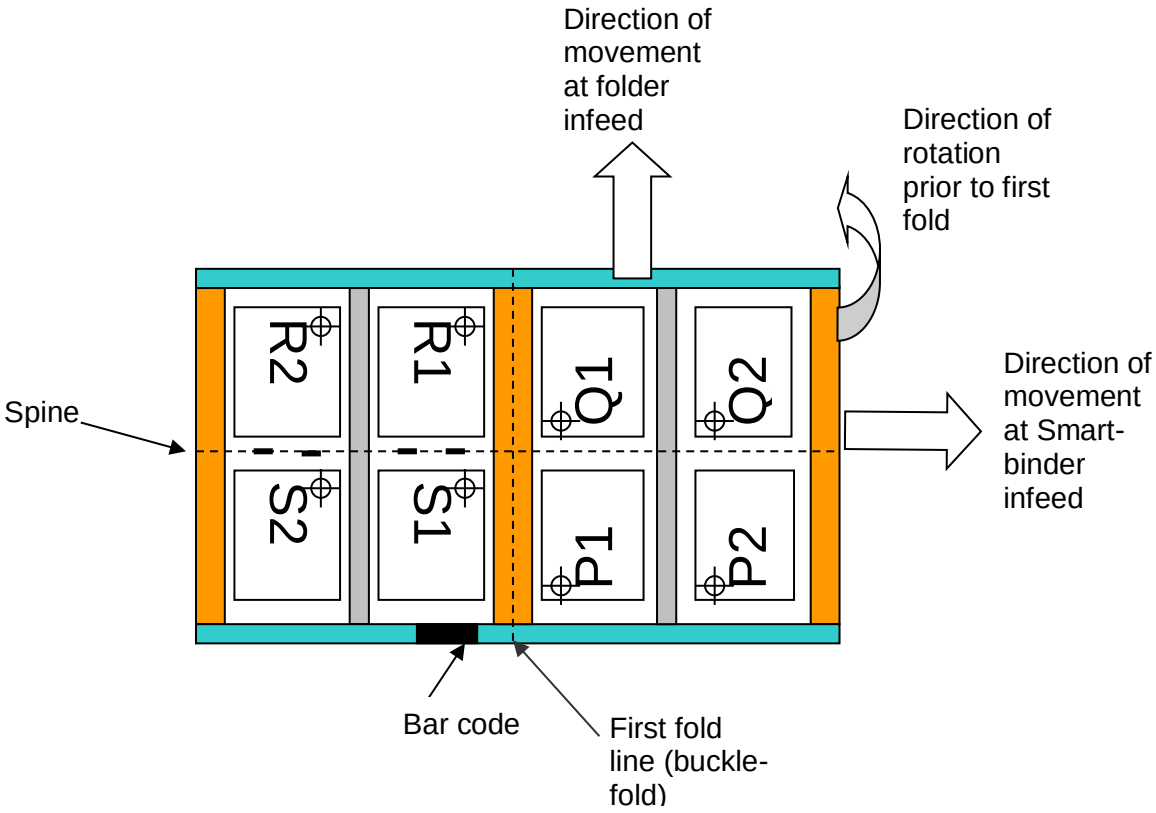


Page Number	**Printer 1**	**Printer 2**
P	4*(*n*-*m*)+2	4*(*n*-*m*)+4
Q	4*(*n*+*m*)-1	4*(*n*+*m*)-3
R	4*(*n*+*m*)-2	4*(*n*+*m*)
S	4*(*n*-*m*)+3	4*(*n*-*m*)+1

Note: It is assumed that Printer #1 prints on the under-side of the sheet and printer #2 prints on the upper side of the sheet

14.6 A6 Landscape (or 4 ¼" x 5 ½" oblong) finished size

	A6 size (Landscape) **105 x 148mm**	**1/4 letter size (oblong)** **4¼" x 5 ½"**
Web Width	442 – 464mm	18 – 18¼"
Sheet cut length	305 – 320mm	11 ½" –12 ½"



Page	**Printer 1**	**Printer 2**
P	4*(*n*-*m*)+2	4*(*n*-*m*)+4
Q	4*(*n*+*m*)-1	4*(*n*+*m*)-3
R	4*(*n*+*m*)-2	4*(*n*+*m*)
S	4*(*n*-*m*)+3	4*(*n*-*m*)+1

Note: Book 1 (P1, Q1, R1 & S1) is nearest the operator on the delivery conveyor.

Note: It is assumed that Printer #1 prints on the under-side of the sheet and printer #2 prints on the upper side of the sheet

15 Guide to Printing for Smart-binder booklet production

15.1 Sheet sequence

The first sheet to enter the Smart-binder needs to be the center sheet of the booklet. The center two pages on this sheet should be facing downwards

1. Sheet sequence for in-line operation *(Smart-binder fed directly from a printer and web cutter):*
The first sheet to be printed should be the center sheet of the booklet

2. Sheet sequence for near-line operation *(roll to roll printing: Smart-binder fed from a pre-printed roll):*
If printing roll-to-roll then the first sheet to be printed will be the last sheet to come off the roll when used to feed the IBIS Smart-binder. This means that the first sheet to be printed should be the outside (cover) sheet of the booklet.

3. Sheet sequence of off-line operation *(feeding the Smart-binder from a sheet pile feeder)* :
The sheet feeder feeds off the top of the pile, so the top sheet must be the center sheet of the booklet.

15.2 Sheet quality

Bar codes must be printed with high enough print quality to enable them to be read by the Smart-binder code reader at high sheet velocity.

Sheets to be fed into the Smart-binder must not contain high levels of static charge, must be flat (not curled) and must not be physically damaged in any way.

Paper stock weights should normally be 60 gsm or higher, although paper weights as light as 50 gsm may be used, subject to testing. Paper weights below 50 gsm may require use of the optional additional in-line buckle-folder.

Sheets that are heavily coated (glossy stock) may not be suitable for ISG cold glue binding (subject to testing). Booklets made from this type of stock should be wire stapled.

Sheets that are printed to stack, for subsequent feeding into the Smart-binder using the optional sheet pile feeder (SB-095, SB-096 or SB-097) must all be the same format size and must be accurately registered to the rear edge of the pileto allow reliable feeding.

15.3 Codes to be printed on each sheet

Note: For more details about code printing see Appendix 32

Every sheet requires a bar code (or 2DDatamatrix code) printed on it which contains at least 8 digits. Digits 1 and 2 must show the number of the sheet in the booklet (first sheet 01, second sheet 02 etc.). Digits 3 and 4 must show the total number of sheets in the booklet (02 for a 2-sheet booklet and 03 for a 3 sheet booklet). Digits 5-8 should all be zeros assuming that no further data needs to be contained in the code. That means if making a 3-sheet booklet then the 3 sheets should have the following codes on them:

01030000
02030000
03030000.

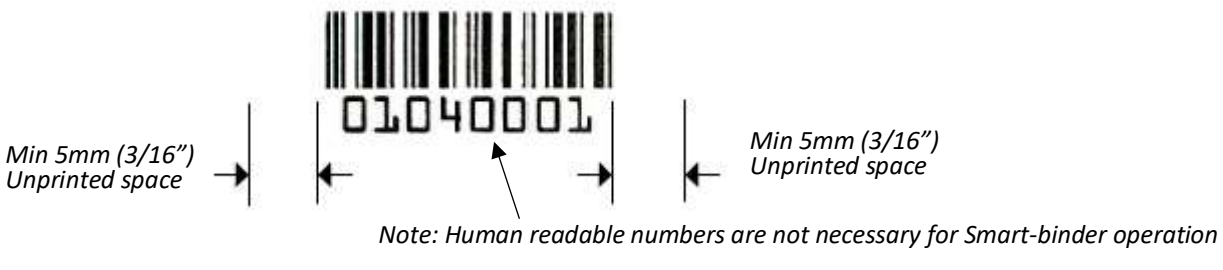
Additional Digits may be also be used to automatically control certain special Smart-binder functions if needed. Digits may be added to show a job number or booklet ID number if needed. Refer to the IBIS Bar Code Guide on the IBIS website HERE for further details.

If feeding a personalized cover from the cover feeder CIF-102 then the cover also needs a code printed on it which must contain the same ID number as printed on the inside sheets. The code on the cover should be 0000 plus the booklet ID number. The Smart-binder will then stop automatically if the cover ID number does not match the sheet ID number.

15.4 Different types of Bar Codes

The following bar codes may be used:
ITF – Industrial 2of5, numeric characters only (0-9), digits are encoded in pairs so there must be an even number of them.
CODE39 – alphanumeric characters, however, it takes up more space because it encodes more characters.
CODE128 – has numeric only & alphanumeric forms, the reader automatically detects the correct type, the numeric form is compact like ITF.

Quiet zones:
Linear bar codes require space before and after the code to allow the reader to discriminate it from other printed marks or linear codes. There should be 5mm of clear paper at either end.



15.4.1 Bar code size:

The minimum code width when using the MS3 reader is 4 mm. However, wider codes can always be read more reliably so we recommend that codes are as wide as possible.

15.4.2 Using ITF codes:

When using a font based code we recommend that the font is at least 26pt (which produces a code approximately 29mm (1⅛") for an 8 digit code.

Do not include check digits in the code, ITF code generators add a padding digit because an ITF code must have an even number of digits. Typically they place this at the start of the code which prevents the sheet number & number of sheets fields from being decoded.

The MS3 Laser reader will read codes of up to about 16 characters at web speeds up to 150m/min.

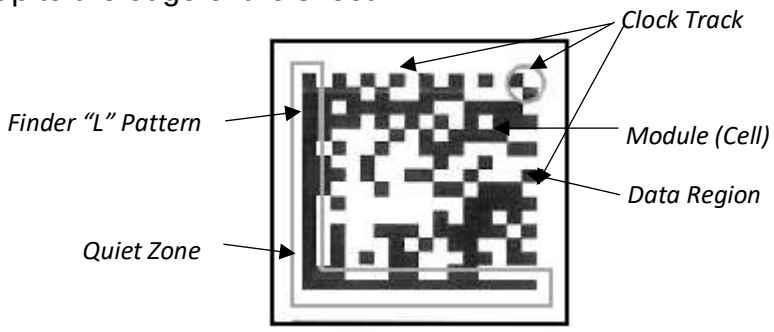
15.4.3 Different types of 2D codes

Datamatrix – 2D code is a compact way of encoding alphanumeric data, can contain hundreds of characters (whereas it is usually not possibly to read linear codes containing more than 16 characters on moving sheets).

QR – similar toDatamatrix, commonly used in Japan as it can encode Kanji/Kana character sets. Widely used these days to encode URL's that you can scan with your phone.

Quiet Zone requirement

2D codes require a quiet zone of at least 1 cell width **all round** which is why they cannot be printed up to the edge of the sheet.



2D code size

For web speeds up to 150m/min the minimum cell size for use with the Smart-binder 2D reader (Microscan Mini Hawk) is 0.4mm (0.015"). Larger cells can help to make reading more reliable.

15.4.4 Capacity ofDatamatrix ECC200 codes

Size (cells)	Size (mm) for 0.4mm square cell	Numeric characters only	Alphanumeric characters
10x10	4	6	3
12x12	4.8	10	6
14x14	5.6	16	10
16x16	6.4	24	16
18x18	7.2	36	25
20x20	8	44	31
22x22	8.8	60	43

Larger capacity codes (using more cells) are available but they have to be more than10mm (3/8”) squareto meet the minimum cell size needed to read the moving code.

DataMatrix codes can be rectangular (eg 8x32) which can be useful if trim-off is limited.

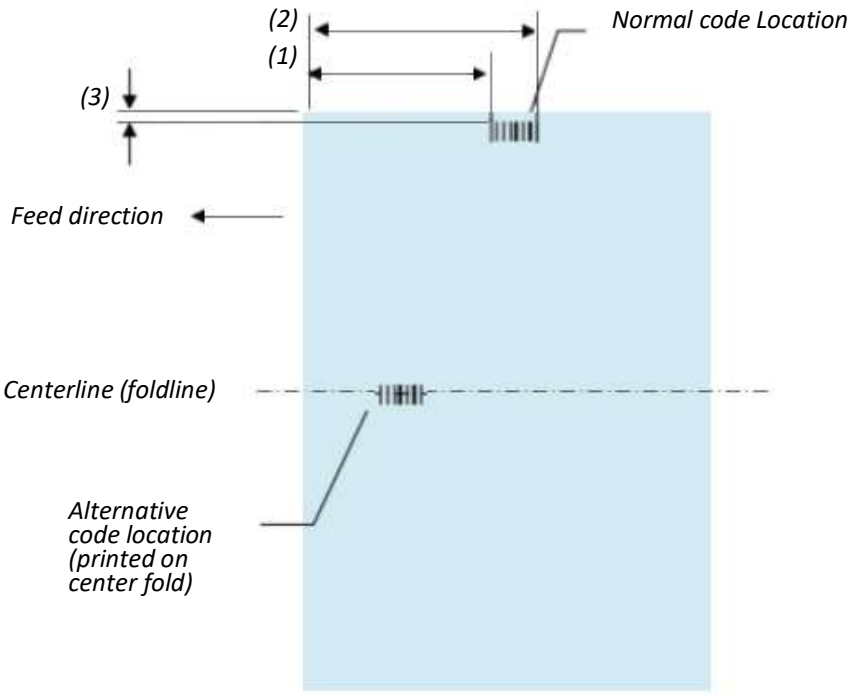
QR codes are approximately 15% larger than Datamatrix codes of the capacity, for example a 21x21 QR code holds 41 numeric or 25 alpha numeric characters (similar to an 18x18Datamatrix) with the lowest level of error correction. They take slightly longer to decode but that does not affect their use with Smart-binder as the readers decode much faster than sheets can be fed. QR codes must be at least 21 modules square (so their minimum size is about 8mm (0.3”) square.

15.5 Code positions

15.5.1 Code position when feeding a Smart-binder directly from a web cutter

(or from a sheet feeder with the code reader positioned on the Smart-binder infeed)

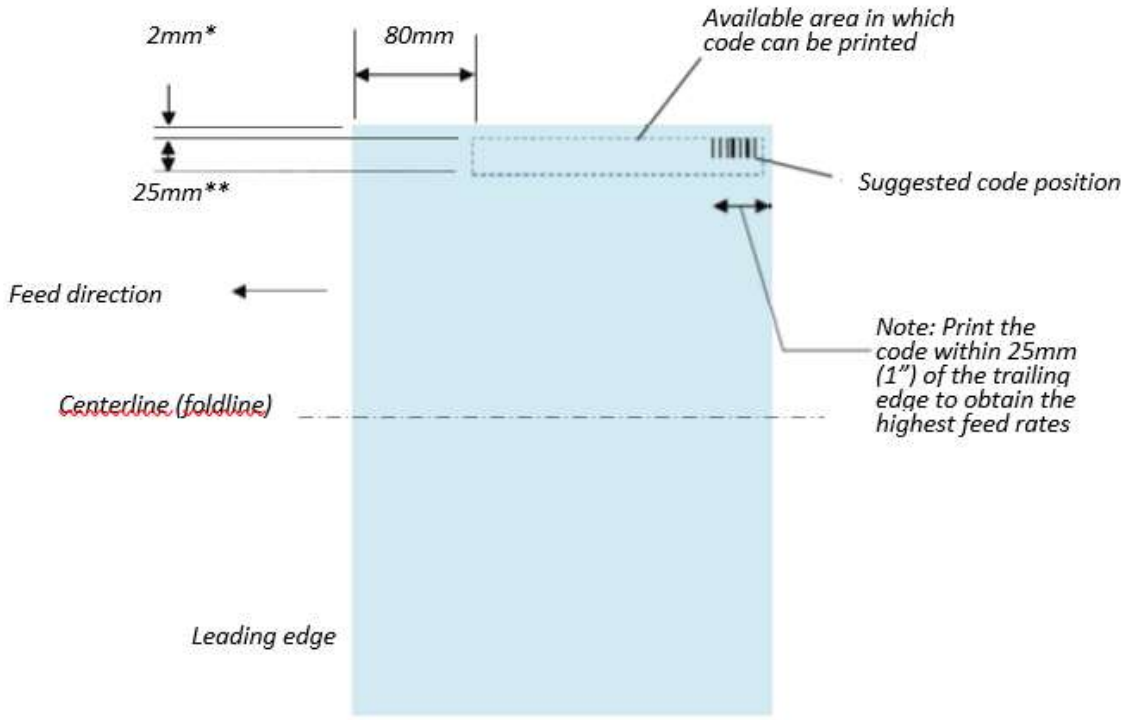
The bar code (or 2DDatamatrix code) on each sheet needs to start at least 6.7” from the leading edge of the sheet. This bar code should be very close to the right edge of the sheet and facing upwards as the sheet feeds into the Smart-binder.



Dimension		Linear code	2D code
(1)	Minimum distance from leading edge of sheet	170mm (6.7”)	170mm (6.7”)
(2)	Maximum distance from leading edge of sheet	Up to trailing edge of sheet	240mm (9.4”)
(3)	Minimum distance from edge of sheet	Can be printed to edge of sheet	Quiet zone defined for code (see 4.2)
Minimum width		Depends on which reader is used	

15.5.2 Code position when running off-line from a sheet pile feeder (SB-095 or SB097) with a code reader mounted in the feeder

Each sheet needs to have a bar code printed on it which is positioned at least 80mm from the leading edge of the sheet. This bar code should be 2mm from the right edge of the sheet and facing upwards as the sheet feeds into the Smart-binder.



Notes

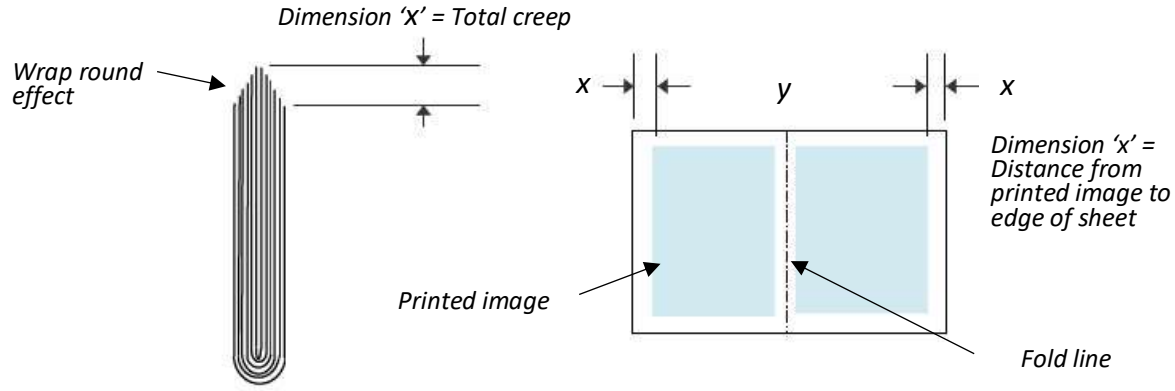
Minimum code width depends on the reader used.

* Codes must be printed a small distance away from the edge of the sheet. This is because the sheet moves slightly as it is picked up by the separator and this can expose the code on the sheet below, hence preventing the reader from decoding the code on the top sheet.

** The code must be positioned no more than about 25mm from the edge of the sheet. This is because there are parts of the feeder which prevent the code reader from being moved to these positions. Normally the code is printed close to the edge of the sheet so that it is removed by then Smart-binder front knife cut and not therefore visible in the finished booklet.

15.6 Image creep

When producing saddle-stitched or thin ISG-glued books, the thickness of the spine causes the outer sheets to appear shorter than the inner sheets when looking at the front edge of the untrimmed book. This is called the 'wrap round' effect. The Smart-binder trims this edge to create a square edge to the book, but, unless this effect is taken into account when impositioning the pages of the book, the print on the inner pages will not line up with that on the outer pages. The effect of this is referred to as image 'creep'.



When impositioning the printed image on each sheet, dimension 'y' must increase by the amount 'x' from the outer sheet to the innermost sheet. If there are 32 sheets in the book then 'y' increases by 'x'/32 from one sheet to the next sheet.
The relationship between the total creep dimension 'x' and the total number of sheets and pages in the book for different paper weights is shown in the table below. For book thicknesses not shown, interpolate values from the table, e.g. for a 9-sheet (36 page) book, use the value for 'x' half way between those for 6 and 12 sheets. For thinner books than those shown, it is not usually necessary to compensate for image creep.
If a separate cover is used, its page layout should be arranged to align with the outer sheet.

Paper Stock Weight													
Gsm		60		70		80		90		100		110	
Lb. bond		16		19		21		24		27		29	
Lb. offset		41		47		54		61		67		74	
Sheets in book	Pages in book	Approximate total creep dimension 'x'											
		mm	inch	Mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
6	24	1.2	0.05	1.4	0.06	1.6	0.06	1.8	0.07	2.0	0.08	2.2	0.09
12	48	2.3	0.09	2.7	0.11	3.1	0.12	3.5	0.14	3.9	0.15	4.3	0.17
18	72	3.5	0.14	4.1	0.16	4.7	0.19	5.3	0.21	5.9	0.23	6.5	0.25
24	96	4.7	0.19	5.5	0.22	6.3	0.25	7.1	0.28	7.9	0.31	8.7	0.34
30	120	5.9	0.23	6.9	0.27	7.9	0.31	8.9	0.35	9.9	0.39	10.9	0.43
36	144	7.1	0.28	8.2	0.32	9.4	0.37	10.6	0.42	11.8	0.46	NA	NA
42	168	8.3	0.32	9.6	0.38	11.0	0.43	NA	NA	NA	NA	NA	NA
48	192	9.5	0.37	11.0	0.43	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not available (this is outside the Smart-binder SB-1, SB-2, SB-3 thickness specification)

16 Operating the Smart-binder

16.1 Booklet thickness changes

Changes in book thickness (number of pages) are normally made automatically, under bar code control, without stopping the machine.

No change or adjustment is needed to the ISG gluing system when the number of pages changes, even if changing from minimum to maximum.

However, for large changes in book thickness when wire stitching (changes more than about3mm (1/8")), it is recommended to adjust stitch wire length and 'leg balance'. This requires the Smart-binder to be stopped and adjustments to be made to the stitching heads. These adjustments take only a few seconds for each stitch head.

16.2 Booklet format size changes

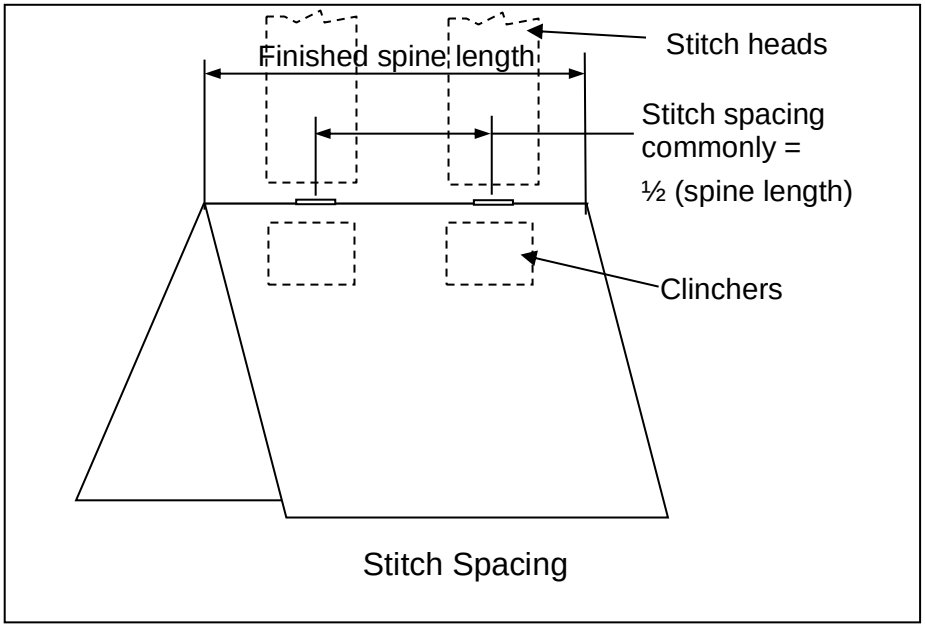
Small format size changes may be made without changing the position of the stitching heads. In this case the changeover may be made in about 5 minutes.

For larger format changes, if the stitch positions need to be moved, then changeover time will increase from 5 minutes to about 10 minutes.

The optional center knife, used for 2-up book production, takes about 5 minutes to fit or remove (assuming lower center-knives are left in position).

Changeover time for upstream equipment must also be taken into account when estimating total changeover time for a complete print-line with in-line finishing.

16.3 Wire Stitch Spacing



Stitch Spacing

16.3.1 "Normal" stitch spacing for most common book sizes

Book size	spine length x width (mm)	Spine length x width (inches)	Stitch spacing (mm)	stitch spacing (inches)
A4	297 x 210	11.69 x 8.27	148	5.83
A5	210 x 148	8.27 x 5.83	105	4.13
Letter	279 x 216	11 x 8.5	140	5.5
Digest	216 x 140	8.5 x 5.5	108	4.25

16.3.2 Limitations on stitch spacing

- Minimum stitching head spacing: 52/8 head = 52mm. 43/6 head = 43mm for thin books without centring device fitted. *Note: The 'centering device' is a spring-loaded inverted 'V' clamp used to centralise the book on the saddle.*
- Minimum clincher spacing = 55mm 2.17" (with lower anvils fitted between clinchers)

(Running without centering devices risks that the stitches may not be exactly on the book spine fold, and is generally not acceptable. Running without lower anvils between clinchers may allow stitches to miss the spine by a small amount – and may not be acceptable.)

16.3.2.1 Notes on stitch spacing

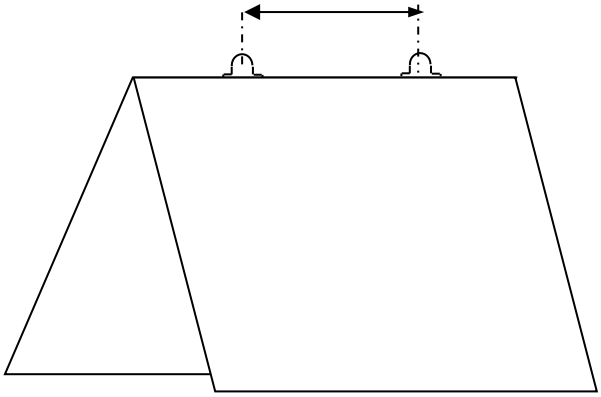
- Generally users will want stitches at "normal" stitch spacing (see table above) or slightly greater spacing. It is not usually desirable to have stitches closer together than the "normal" distance.
- It is not usual for users to insist on precise stitch spacing – except where loop stitches are used.
- Stitches are usually arranged symmetrically (distance from end of spine to stitch is same at both ends of spine).

16.3.2.2 Possible methods of dealing with stitch position for different book sizes

For a user who wants to run 2 different sizes, say A4 and A5 or letter and digest, there are several ways of dealing with stitch position and the changeover between sizes:

- Always adjust stitch heads and clinchers to be at exactly the "normal" position (using current standard parts). This takes up to 5 minutes, but will give best results with no compromises on quality.
- Leave the stitch heads and clinchers in one position for both sizes, say 148mm spacing for A4 and A5, this will give stitches that look of a long way apart for A5. A better compromise may be about 135mm, which will look better on the small books, but will not look too bad on the larger books. With this method, there is no changeover time for moving stitch heads and clinchers for different sizes.

Stitch Spacing when Loop Stitching (Option LST-100)



- A4 books, 2 loop stitches 80mm (3.15”) apart.
- A4 books, 4 loop stitches 80mm (3.15”) apart.
- A4 books, 2 loop stitches 80mm (3.15”) apart and 2 standard stitches 240mm (9.45”) apart.
- A5 books, 2 loop stitches 80mm (3.15”) apart
- Letter size books, 3 loop stitches 4.25” apart

Other loop stitch spacings are used, but this list covers all those most commonly encountered.

Loop stitches are practically always arranged symmetrically on the spine (distance from end of spine to nearest stitch is the same at both ends).

Stitch heads and clinchers must be set to exact spacings for loop stitches (to match standard ring binders).

Whenever loop stitch spacing needs to change it is necessary to set the heads and clinchers exactly, which can take about 5 minutes.

Note that all common Metric/European loop stitch spacings can be made with stitch heads and clinchers in fixed positions.

Changeover from loop stitch to standard stitch

Stitching heads need to be removed from the machine and either swapped for alternative heads or a conversion kit installed. It should only take a few minutes per head to convert from standard to loop stitches or vice versa.

16.4 Using the Cover/Insert Feeder option CIF-102

The Cover Feeder for saddle-bound books can be loaded with up to approximately 20mm pile height or about 200mm pile height if using the optional additional CAL-101 cover Autoloader. The cover pile can be replenished without needing to stop the machine.

Covers should be flat and should be stored covered or wrapped in the same environment as the Smart-binder (temperature and humidity). Covers with damaged or curled edges will not feed reliably.

The cover feeder may also be used to feed insert sheets. An insert in the center of the book requires a gap in the sheet feed after the last sheet of each book into which to feed the insert sheet.

The maximum cover feed rate is 116 covers/min, depending on stock etc.

If feeding a cover/insert sheet and ISG cold-gluing, then the cover/insert sheet must be fed into a gap between sheets (not on top of another sheet)to receive a line of cold glue. This gap is not necessary if wire-stitching.

If ISG cold-gluing a cover or insert which is coated (non absorbent) on the inside then the operator can select to apply a continuous glue line (instead of a row of glue 'dots') on the cover/insert sheet only, to increase cover adhesion strength.

16.5 Working with printed paper rolls, or printed stacks of sheets

Printed paper rolls (reels) should be stored carefully, in the environment in which they will be used and sealed in plastic film prior to use, to ensure that they are in optimum condition for use. The outside part of any new reel should be discarded before use to avoid damaged or dirty paper going through the line.

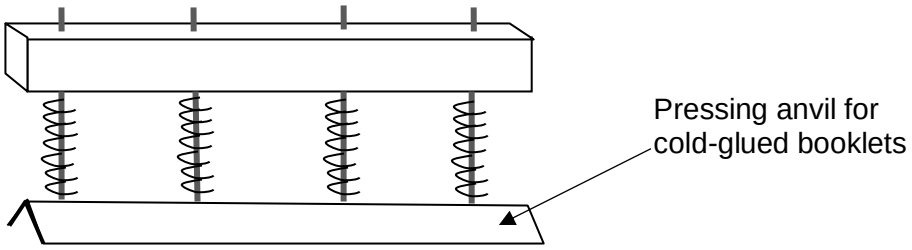
Printed sheet stacks (for off-line operation) should be flat, and should be stored in the environment in which they will be used. Damage to stack edges and curl will reduce reliability of the Smart-binder pile feeder.

Toner should be properly fused to all digitally printed sheets. If not, it will transfer from the paper onto parts of the Smart-binder and cause book marking. If toner does transfer to Smart-binder guides or belts, clean them using a cloth soaked in alcohol, or soap and water.

Paper stocks lighter than about 50 gsm require use of the optional F-100 folder connected to the SB infeed, and the optional ASS-100 anti-static system.

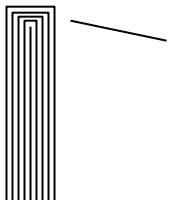
16.5.1 Changing between wire stitching and ISG cold-gluing

A changeover from wire stitching to ISG cold gluing can be done on-the-run (if stitching heads are to be left in position). However, for optimum quality the stitching heads may be removed to enable the ISG press-down 'anvil' to be fitted in their place, which requires a few minutes changeover time. The ISG gluing nozzle can be activated from the operator 'touch-screen'.



16.5.2 Using the optional 'Spine-squaring' unit SM-101 or ARSD-S-100

The spine squaring unit receives finished booklets and presses their spines into a square shape (see Appendices 20 and 21) .



However, the effectiveness of this squaring process diminishes as the booklet thickness increases.

The Spine-squarer may be connected in-line to the end of the Smart-binder delivery conveyor.

With the SB-4 the connection to the BB3002 binder must be removed before the SM-101 can be fitted.

The SM-101 is 660mm long and 710mm wide and requires a single phase power input (3 Amps at 240 Volts: other voltages available as required) .The maximum cycle rate of the SM-101 is 28 books/min. The ARSD-S-100 should be used if faster cycling speeds are required.

16.6 Maintaining the Smart-binder

16.6.1 Spare Parts

16.6.1.1 Stitching Heads

The Smart-binder is supplied with two Hohner stitching heads (43/6S) which pull 0.4 – 0.6mm round-section wire from wire spools mounted on the back of the machine. These heads include special wire clinchers that are manufactured uniquely for use on the IBIS Smart-binder. *Note: do not attempt to use standard Hohner clinchers because they will not fit on the Smart-binder.*

Damaged stitching heads may be returned to your local Hohner representative for repair, or returned to IBIS.

To minimise machine downtime in the event of a damaged stitching head, it is recommended that customers hold at least one spare head. A stitching head can be changed in minutes by the operator, and repaired or cleaned when off the machine.

Loop stitch heads (Option LST-100) may be used but require a special stitcher drive modification (refer to IBIS for quotation)

16.6.1.2 Spares Kits

Spare parts kits are available in either Essential, Basic or Extended forms:

Essential Spare Parts Kits
Smart-binder Essential spare parts kit (available for SB-1, 2,3 or 4)
Additional Essential Spare Parts for Smart-binder optional modules

Basic Spare Parts Kits
Smart-binder Basic spare parts kit (available for SB-1, 2,3 or 4)
Additional Basic Spare Parts for Smart-binder optional modules

Extended Spare Parts Kits
Smart-binder Extended Spare Parts kit (available for SB-1, 2,3 or 4)
Additional Extended Spare Parts for Smart-binder optional modules

The 'Essential' spare parts kits contain components that are likely to be needed during normal operation. The 'Basic' spare parts kit contains additional components that might be damaged in the event of a severe jam or parts to repair other general machine malfunctions. It is recommended that this kit is held at sites where time -critical jobs are being run.

An 'Extended' spare parts kit contains components that can fail but are not commonly required. This kit is primarily intended for re-sellers who are offering a maintenance service, but may also be justified to be held at any site with several Smart-binders.

16.6.2 Scheduled Maintenance SMP and Customer Support CSP

Scheduled maintenance kits are also available. These contain parts that are needed to carry out the scheduled maintenance programme for the Smart-binder. There is a kit for each service interval (every 3,000 operating hours).

It is recommended that all Smart-binder scheduled maintenance is carried out by IBIS according to the IBIS Scheduled Maintenance Programme (SMP). Refer to IBIS for full details.

Following installation of a new Smart-binder system it is recommended to select the IBIS CSP (Customer Support Program) which includes Preventative Maintenance (PM) and the following additional support services:

IBIS CSP program

- One week on-site support by an IBIS technician during the first week of live production.
- No charge supply of all replacement parts required during normal machine operation, excluding consumables such as trimmer knives and stitching wire. Priority given to urgent spares orders for quickest possible delivery.
- One follow-up visit by an IBIS Technician to take place between 5 and 7 months after installation to ensure the machine is operating correctly, is correctly adjusted and to provide 'refresher' training.
- One visit by an IBIS Technician between to take place around 11 and 12 months after machine installation to complete scheduled preventative-maintenance (PM).
- All required preventative-maintenance (PM) parts.

- Access to IBIS technical support telephone hot-line, including out-of-hours support.
- Priority given to IBIS technician on-site reactive support when needed, and special reduced price per visit.
- Performance related software and hardware upgrades.

16.6.3 Smart-binder 'Consumables'

16.6.3.1 Stitching Wire (consumable)

Two2.5K (5.5lbs.) (5 lb) spools of wire are supplied with each Smart-binder, enough for 43,000 to 60,000 stitches from each head (depending on book thickness – thin books need slightly less wire per book than thick books). This is sufficient for normal system commissioning after initial new machine installation.

Other sizes of wire spool (up to 100Kg/220lbs) are available; refer to IBIS for more information.

A suitable wire vendor should be found to provide good quality round cross section wire between 0.4 and 0.6mm in diameter (or wire may be purchased from IBIS).

16.6.3.2 Glue (consumable)

16.6.3.2.1 ISG cold glue

Smart-binders fitted with the ISG glue system (see Appendix 1) are supplied with 5 litres of cold glue, which is sufficient for the normal machine commissioning period. Thee normal recommended glue is Pafra PVA cold glue AQUAPAL 9278 (sold also by Robatech as R-5183L50), but alternative glues may sometimes be used for difficult applications, such as with the use of coated paper stocks. **It is essential that only glues approved by IBIS with the correct viscosity are used to avoid glue application problems.**

The Smart-binder uses approximately one litre of ISG cold-glue for every 78,000 sheets (312,000 pages) when applying 'dots' of glue at normal spacing. When calculating glue usage per booklet note that:

- The center sheet in each booklet automatically receives no glue .
- Normal uncoated absorbent paper stocks require only 'dots' of glue spaced about 4 - 8 mm apart. However it is possible to select to apply more glue (such as a continuous line of glue) to the outside cover compared to the insider sheets, which may increase glue consumption. Additional glue may be required for example if using a coated cover.

16.6.3.2.2 Cost Comparison: wire stitching vs ISG cold gluing

Wire stitching

The cost of wire to produce 1000 wire-stitched booklets is about GBP £0.74 (GB Pounds.. 2020 price) if purchased from IBIS. This cost may be lower if buying from a local supplier. The cost does not vary much between a thin and a thick booklet.

ISG cold gluing

The cost of ISG cold-glue binding depends on the number of sheets in the booklet. The cost of Eukalin cold-glue (specification R5183-L50) needed to produce 1000 A4 booklets is as follows (assuming glue purchased from the glue manufacturer):

Number of sheets in booklet	Number of pages in booklet	Cost of ISG for 1000 A4 books (GB Pounds: 2020 pricing)
4	16	£0.08
10	40	£0.26
30	120	£0.82

***Note 1**: In summary ISG glue is a lower cost compared with wire staples when making A4 booklets containing up to about 100 pages in thickness or A5 booklets up to about 140 pages (assuming glue purchased directly from the glue manufacturer)*
***Note 2:** If the booklets are A5 size then the cost of glue shown above is reduced by 30%*
***Note 3**: The ISG cold glue system is easier and less expensive to maintain than the wire stitching system. Also, ISG glued booklets are stronger and lay flatter than wire stapled booklets*

16.6.3.2.3 EVA hot-melt glue (SB-4, SB-5 or SB-1G4 only)

The perfect binder is supplied with a small amount of hot melt glue in the glue tank, sufficient for normal commissioning. Refer to IBIS for recommended glue.

16.6.3.3 Trimmer knives (as used for saddle-bound booklet production)

The knives require sharpening at intervals depending on machine usage (these intervals are normally at least some weeks and usually months). Sharpening is best carried out by a local specialist. For budgeting purposes, assume knives are reground monthly and replaced with new annually.

Knives must only be changed or adjusted by a trained technician. IBIS provides this training as part of the 5-day Smart-binder service engineer maintenance training course.

Knives are used in pairs consisting of an upper shear knife and a lower bed knife (pairs are not matched: any new or reground upper shear knife may be used with any new or reground bed knife). If one of the pair is changed, the other should also be changed, otherwise premature wear of the new knife will occur.

The same knives are used in the three main knife positions: a complete set of main knives is made up of 3 pairs of shear and bed knives.

The center-knife assembly CKN-100 or 101 consists of a special shear knife, with two cutting edges, and a pair of bed knives (see Appendix 15). Alternatively option CKN-102 has a singled bladed upper knife and only one lower knife. As with other knives, these should be treated as a set, and all be changed together.

We recommend that at least two sets of knives are purchased in addition to the set supplied with the machine. This allows for one set to be in use on the machine, one set to be away for regrinding and one set ready to install in case the knives in use are damaged.

One spare set of knives is included in the basic spares kits; additional sets can be purchased from IBIS:

Option number	Trimmer knife blade sets
SKK-100	Trimmer knives: face head and foot (3 upper and 3 lower).
SCK-100	¼” Center knives (1 upper and 2 lower)
SCK-101	3/8” Center knives (1 upper and 2 lower)
SCK-102	Single bladed Center-knife (1 upper and 1 lower)

16.7 Smart-binder log-files, diagnostics and connection to external MIS systems

16.7.1 Log files

These can be found in the Smart-binder PC controller D: drive. A new file is created every time the Smart-binder operating software starts and is called 'LogNNNN.txt' where NNNN is a sequential number. Files are limited to about 1Mbyte and a new file started when this limit is reached. Logfiles are deleted automatically when they are 100 days old.

16.7.2 Connecting the Smart-binder to a network (external MIS system)

Connect to the network port (Smartbinder supports 10/100) on the PC card (upper left of the control panel at back of machine). The log files are on the Hard disk drive (if fitted) drive letter D: (or if you do not have a Hard disk drive they will be in c:\temp). Share the folder (C:\temp or D:)to be able to see it over the network. The Smart-binder runs on a stripped down version of windowsXP so you do not have the full range of menus, however, you can create a share on a folder by right clicking the appropriate folder with a mouse.

The optional Smart-Data analysis system SDA-100 assists connection to an external network.

See IBIS document **Smartbinder_Diagnostics** for further information.

17 Planning a Smart-binder installation (SB-1, 2 and 3)

When planning installation and commissioning, allow 2 days to install the Smart-binder and approximately 8 days for system commissioning and operator training, prior to the start of live production (this time may be reduced if installing an off-line Smart-binder) . Allow some extra days for commissioning systems which include optional modules such as F-100, RF-100, SB-097, BSS-10.

17.1 Installation schedule (SB-1, 2 and 3)

Day	Activity
1	Unpacking, checking shipment and moving into position
2	Assembling Smart-binder, connecting power
3-6	Commissioning: requires printed work and covers available from day 3.
7-10	Operator training
11-12	Pre-production tests

In particular connection of power (day 2), the availability of printed work (day 3) and the availability of trainees (days 7-10) are critical to meeting this schedule.

17.2 Preparing the site Refer to the Smart-binder Installation Questionnaire for full list of all site preparation issues

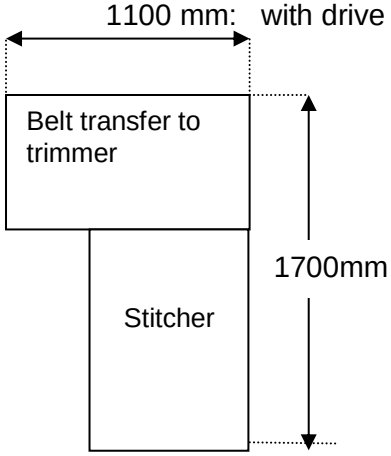
Installation questionnaire

The IBIS installation questionnaire is included with all IBIS 'Order Confirmations' (issued to the byer on receipt of all new SB machine Orders)

Access:

Ensure that there is sufficient space to manoeuvre the largest Smart-binder module into the final position (see below for dimensions of largest module). This is particularly important where this unit must pass through doorways.

1550mm: normal dimension
1400mm: with drive motor removed
1100 mm: with drive motor and control box removed



Floor:

The machine should be sited on a substantial floor, which is level over the total area of the machine to within10mm (3/8") (3/8"). The layout drawings shown on the next pages show floor loads applied by the Smart-binder. The floor must be able to withstand at least these loads without damage or movement.

Space around the machine: Allow adequate space for:

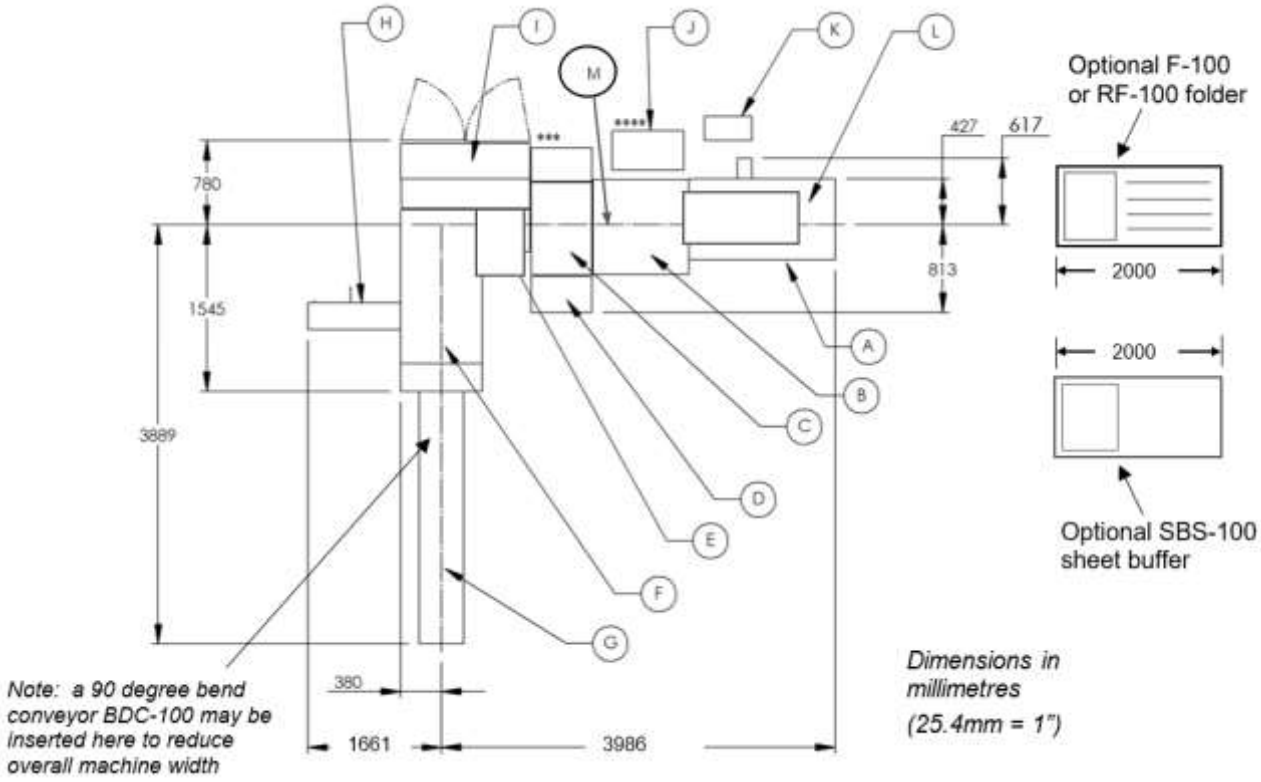
- All the machine guards to be fully removed.
- Electrical box doors to be fully opened (mounted on the back of the machine, behind the stitcher)
- Operators to move freely in the working area between the delivery conveyor, cover feeder and pile feeder if one is installed.
- Access to all sides of the machine for maintenance. Particularly, at the end of the Stitcher module to allow the saddle skirts to be removed.

- The trimmer waste collection bin, if the TWC-100 or TWC-101 removal conveyor is used (see Appendix 4).
- Trimmer waste conveyor removal: allow about 1 meter space to pull the conveyor out from the trimmer.
- Floor standing Wire Spools (for example the optional 100kg wire spools which mount on the floor behind the Stitcher). Note: the standard2.5K (5.5lbs.) spools mount on the machine and do not take up any floor space.
- The vacuum pump(s), transformer and interface unit for pile feeders.

The following layouts show space requirements for different variants of the Smart-binder.

17.2.1 Layout of basic Smart-binder SB-1,2 or 3

Plan of in-line version Smart-binder SB-1, SB-2 and SB-3 – showing machine size and parts of machine.



SB-1, SB-2 and SB-3 Smart-binder elements			
A	Infeed conveyor	**H**	Trimmer waste conveyor (optional)
B	Scoring and folding	**I**	Electrical enclosure
C	Collator	**J**	Transformer (optional) *(optional.. needed only for input voltages outside the 380 – 415v range)*
D	Operator interface	**K**	Vacuum pump
E	Stitcher	**L**	Cover feeder (optional)
F	Trimmer	**M**	ISG Gluing (SB-3 only) +++
G	Delivery conveyor		

Machine height: 1350mm (53”) with guards closed.

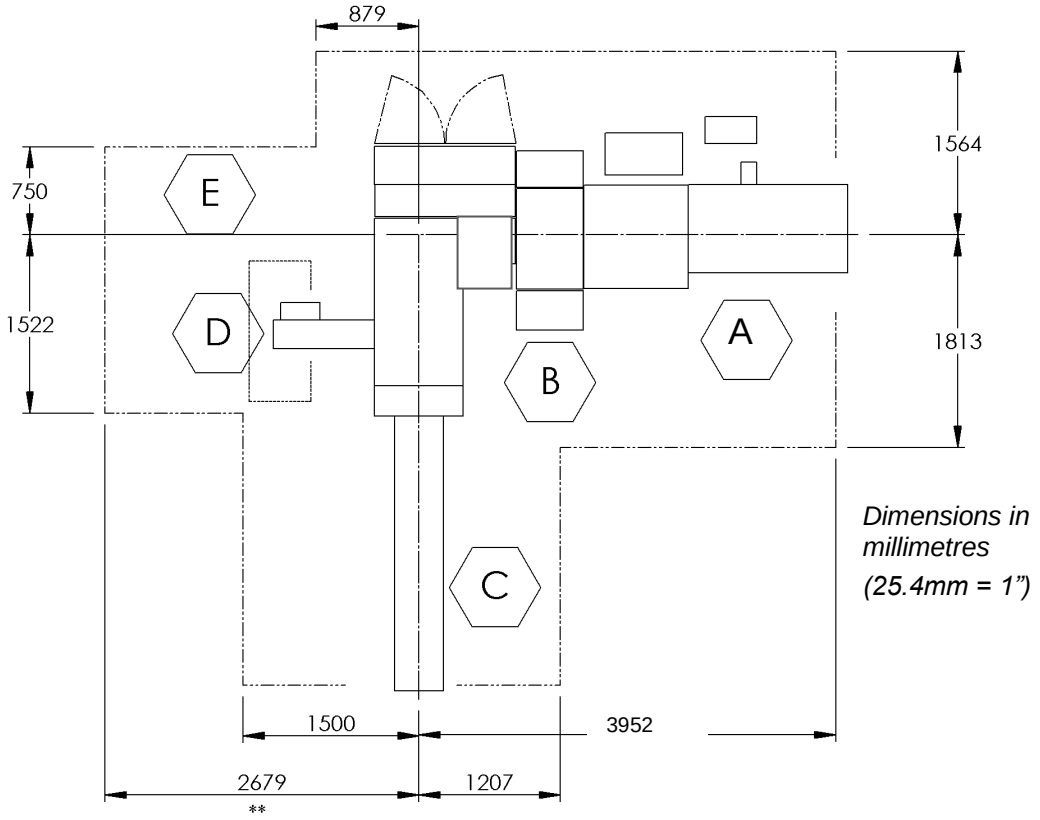
Ceiling height required to allow guards to open: 2500mm (98.5”) over trimmer and 2000mm (79”) over rest of machine.

*** Electrical supply position. 3 metre cable and plug supplied, so customer's power socket must be within 3meters of this point.

**** Electrical supply position when transformer is supplied (supplies both main Smart-binder and pile feeder). Customer provides wiring to terminals in transformer housing.

+++ ISG glue option requires a high pressure air supply.

Plan of in-line Smart-binder showing clearance needed around machine.



Dimensions in millimetres
(25.4mm = 1”)

The area within the chain dotted line must be clear of fixed obstructions to allow operator and service access to the machine.

A - Cover Loading Position

B - Control Panel

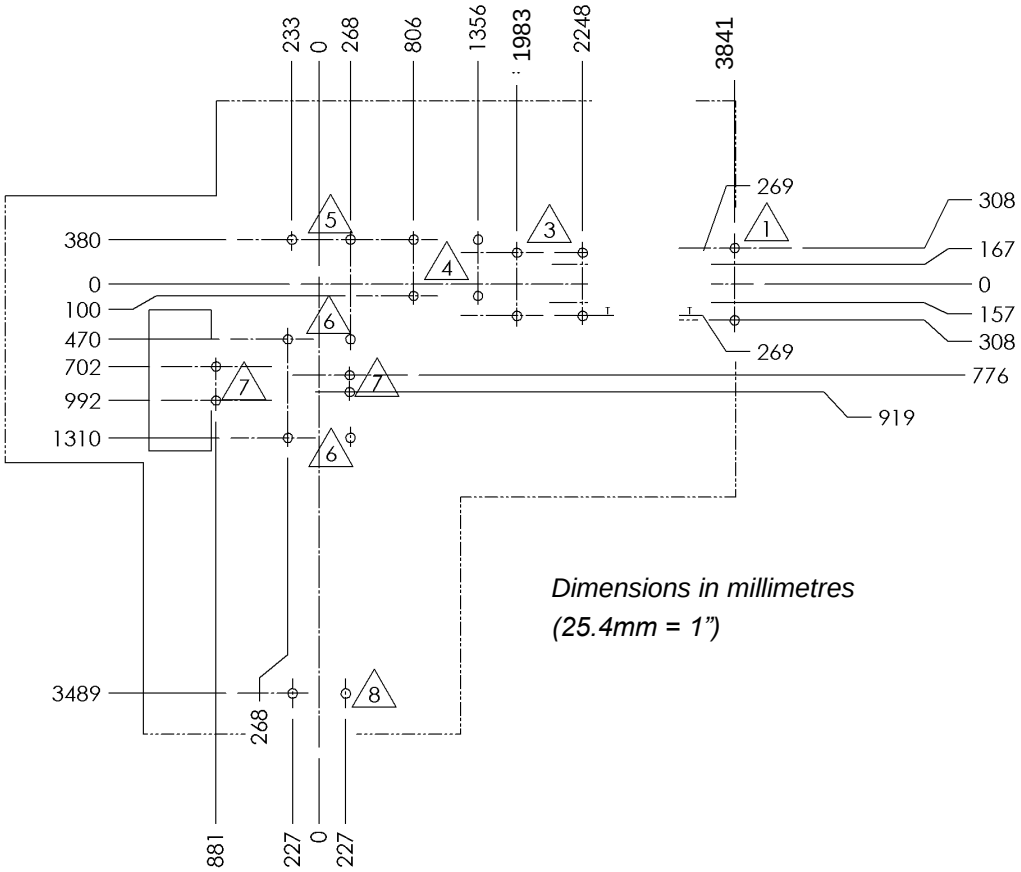
C - Position for Removal of Finished Books from Delivery Conveyor

D - Location of Waste Bin when used with standard trimmer waste removal conveyor

E - Space for Removal of Saddle Skirts (Service and Maintenance)

** This dimension is needed to allow space to remove saddle skirts and space to remove the trimmer waste conveyor.

Plan showing floor loadings of all feet of installed Smart-binder.



Feet	Quantity	Maximum static load per foot	
1	2	40 kg	88 lb
3	4	140 kg	308 lb
4	4	500 kg	1100 lb
5	4	500 kg	1100 lb
6	2	500 kg	1100 lb
7	4	20 kg	44 lb
8	2	30 kg	66 lb

Feet are typically 70 mm (2.75") diameter. Actual loads on each foot are usually much lower, but floor must be able to withstand the loads in this chart.

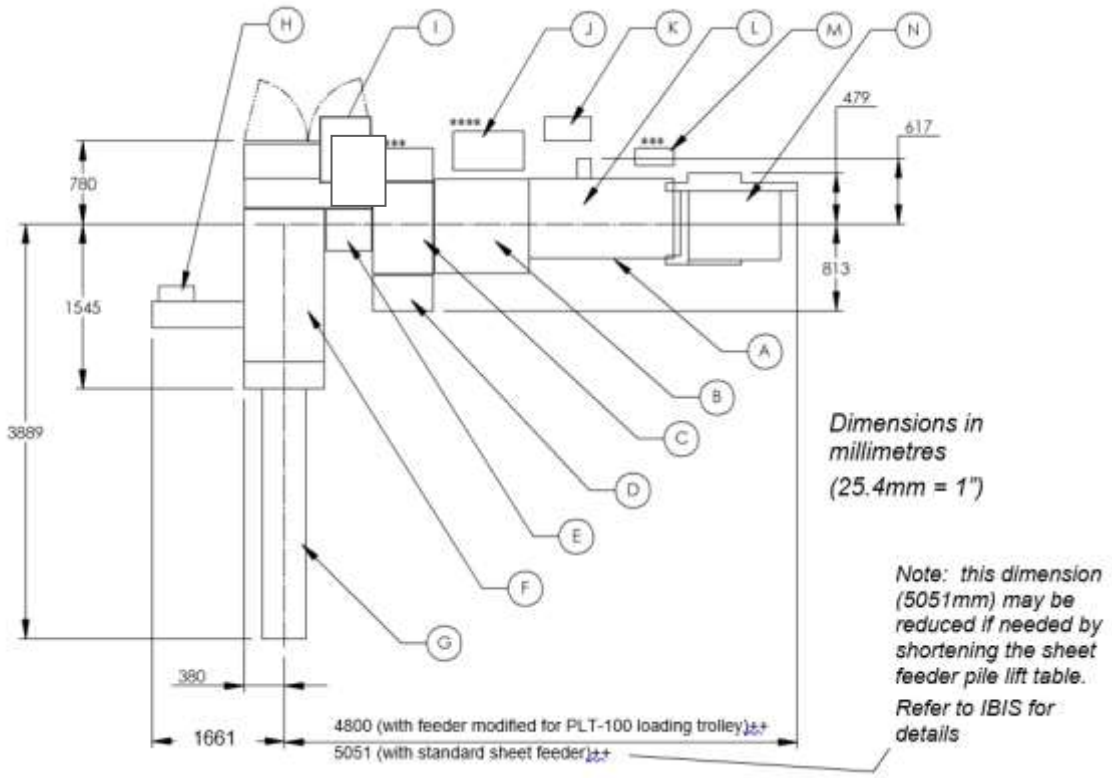
Total machine weight 1900 kg (4200 lb).

Maximum dynamic loads during operation +/- 40 kg (+/- 88 lb) over feet number 6 (Trimmer).

During installation machine is moved on wheels, which can apply more concentrated loads than those listed here. This is not usually a problem but can make machine alignment and movement on soft floor surfaces difficult.

17.2.2 Layout of Off-line version Smart-binder SB-1, 2 or 3

Plan of off-line Smart-binder SB-1, 2 or 3 – showing machine size and parts of machine.



Smart-binder elements			
A	Infeed conveyor	**H**	Optional trimmer waste conveyor
B	Scoring and folding	**I**	Electrical enclosure
C	Collator	**J**	Transformer *(optional.. needed only for input voltages outside the 380 – 415v range)*
D	Operator interface	**K**	Vacuum pump
E	Stitcher	**L**	Cover feeder
F	Trimmer	**M**	Pile Feeder Interface Box
G	Delivery conveyor	**N**	Pile Feeder

Machine height: - 1350mm (53") with guards closed.

Ceiling height required to allow guards to open: 2500mm (98.5") over trimmer and 2000mm (79") over rest of machine.

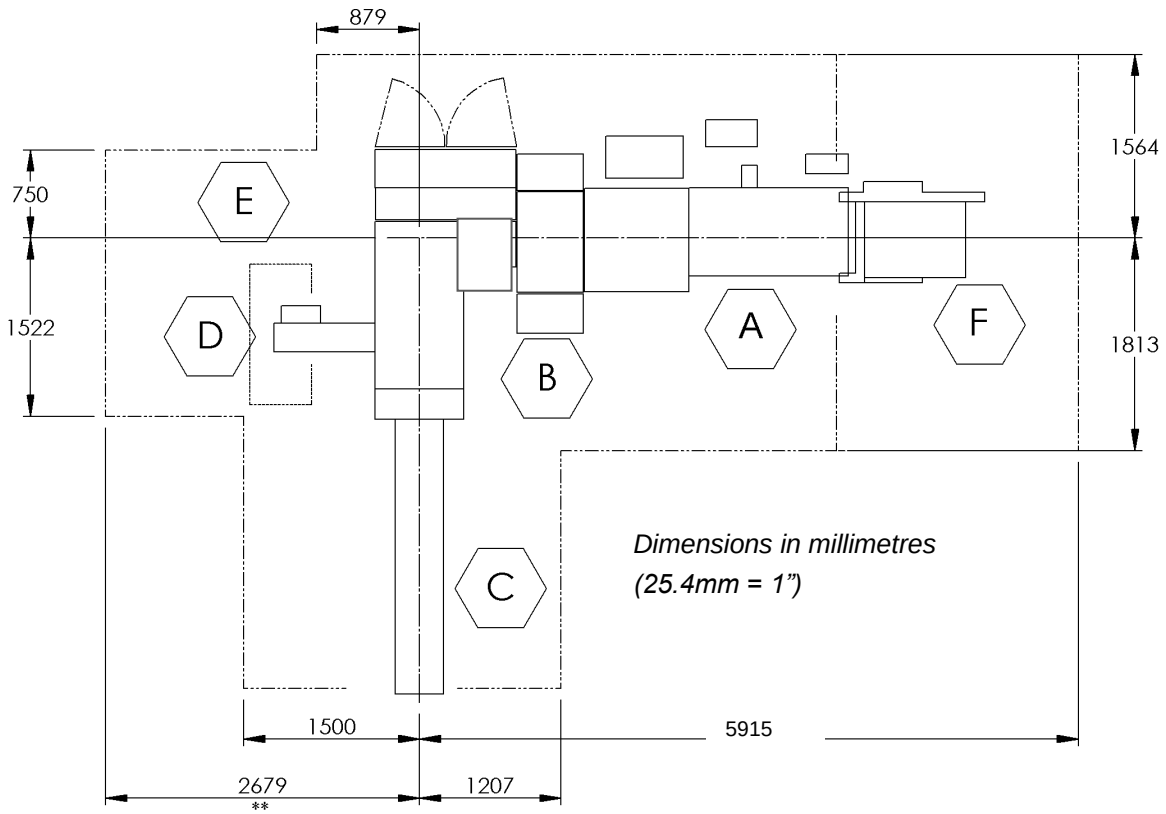
*** Electrical supply positions (one for main Smart-binder, one for pile feeder). 3 metre cables and plugs supplied so customer's power sockets must be within 3meters of these points.

**** Electrical supply position when transformer is supplied (supplies both main Smart-binder and pile feeder). Customer provides wiring to terminals in transformer housing.

++ These dimensions increases by 330mm when the DMP-100 perforator is fitted (Appendix 11).

+++ ISG glue option requires a high pressure air supply.

Plan of off-line Smart-binder SB-1, SB-2, SB-3, showing clearance needed around machine.

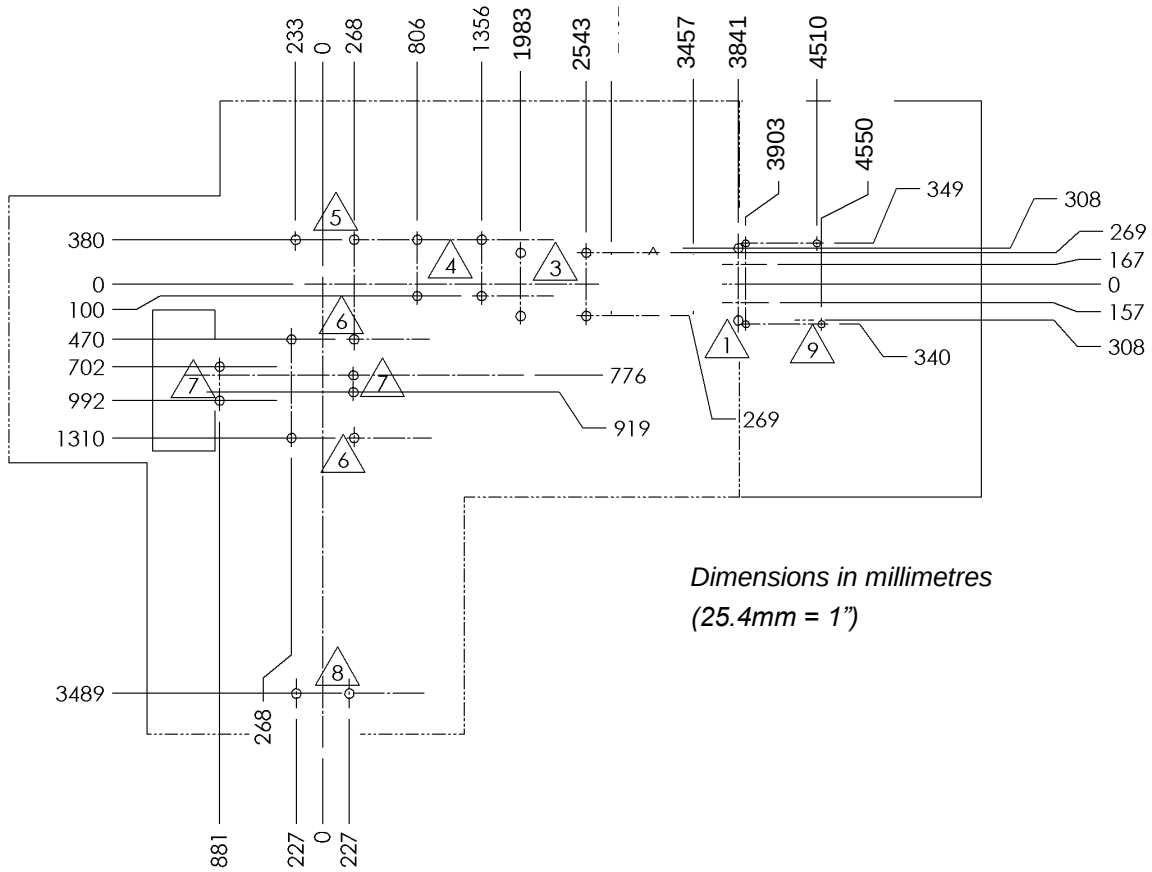


The area within the chain dotted line must be clear of fixed obstructions to allow operator and service access to the machine.

A - Cover loading position
B - Control panel
C - Position for removal of finished books from delivery conveyor
D - Location of waste bin when used with standard trimmer waste removal conveyor
E - Space for removal of saddle skirts (service and maintenance)
F - Sheet feeder loading area

** This dimension is needed to allow space to remove saddle skirts and space to remove the trimmer waste conveyor.

Plan showing floor loadings of all feet of installed off-line Smart-binder.



Dimensions in millimetres
(25.4mm = 1")

Feet	Quantity	Maximum static load per foot	
1	2	40 kg	88 lb
3	4	140 kg	308 lb
4	4	500 kg	1100 lb
5	4	500 kg	1100 lb
6	2	500 kg	1100 lb
7	4	20 kg	44 lb
8	2	30 kg	66 lb
9	4	100 kg	220 lb

Feet are typically 70 mm (2.75") diameter. Actual loads on each foot are usually much lower, but floor must be able to withstand the loads in this chart.

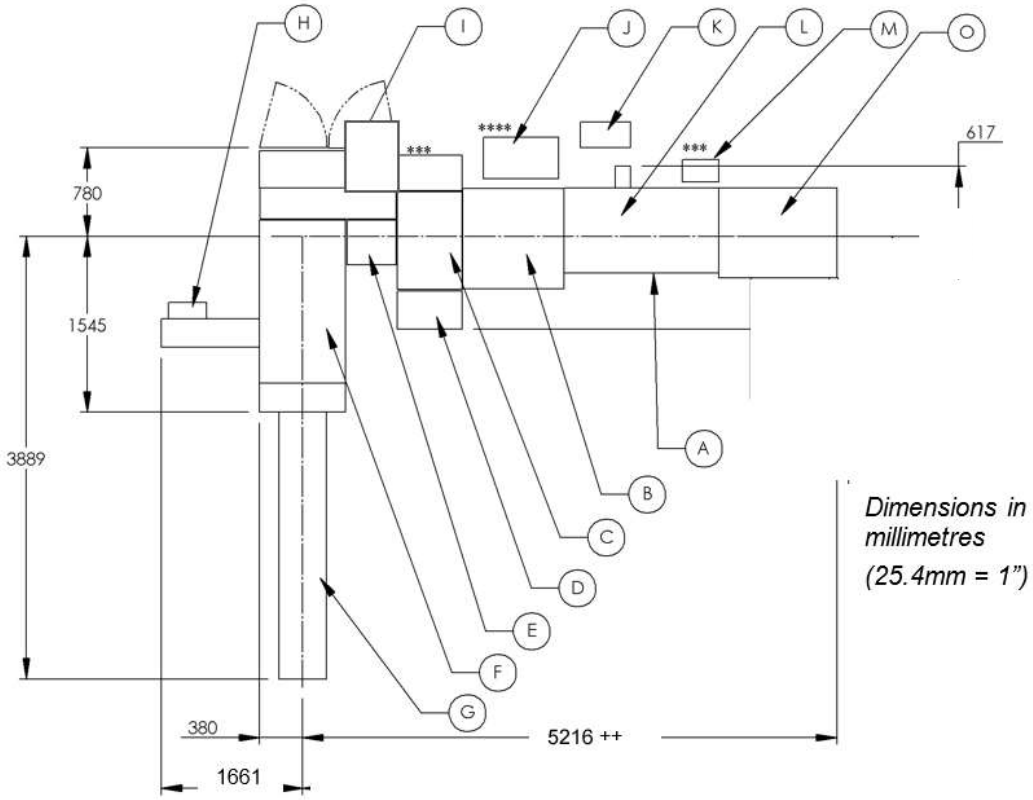
Total machine weight 2100 kg (4600 lb).

Maximum dynamic loads during operation +/- 40 kg (+/- 88 lb) over feet number 6.

During installation machine is moved on wheels, which can apply more concentrated loads than those listed here. This is not usually a problem but can make machine alignment and movement on soft floor surfaces difficult.

17.2.3 Layout of in-line Smart-binder SB-1, 2 or 3 with optional SB-097 sheet pile feeder

See Appendix 7



Smart-binder elements			
A	Infeed conveyor	**H**	Trim waste conveyor (optional)
B	Scoring and folding	**I**	Electrical enclosure
C	Collator	**J**	Transformer (optional) *(optional.. needed only for input voltages outside the 380 – 415v range)*
D	Operator interface	**K**	Vacuum pump
E	Stitcher	**L**	Cover feeder
F	3-knife trimmer	**M**	Pile Feeder Interface Box
G	Delivery conveyor	**O**	Sheet pile feeder (SB-097)

Machine height: 1350mm (53") with guards closed.

Ceiling height required to allow guards to open: 2500mm (98.5") over trimmer and 2000mm (79") over rest of machine.

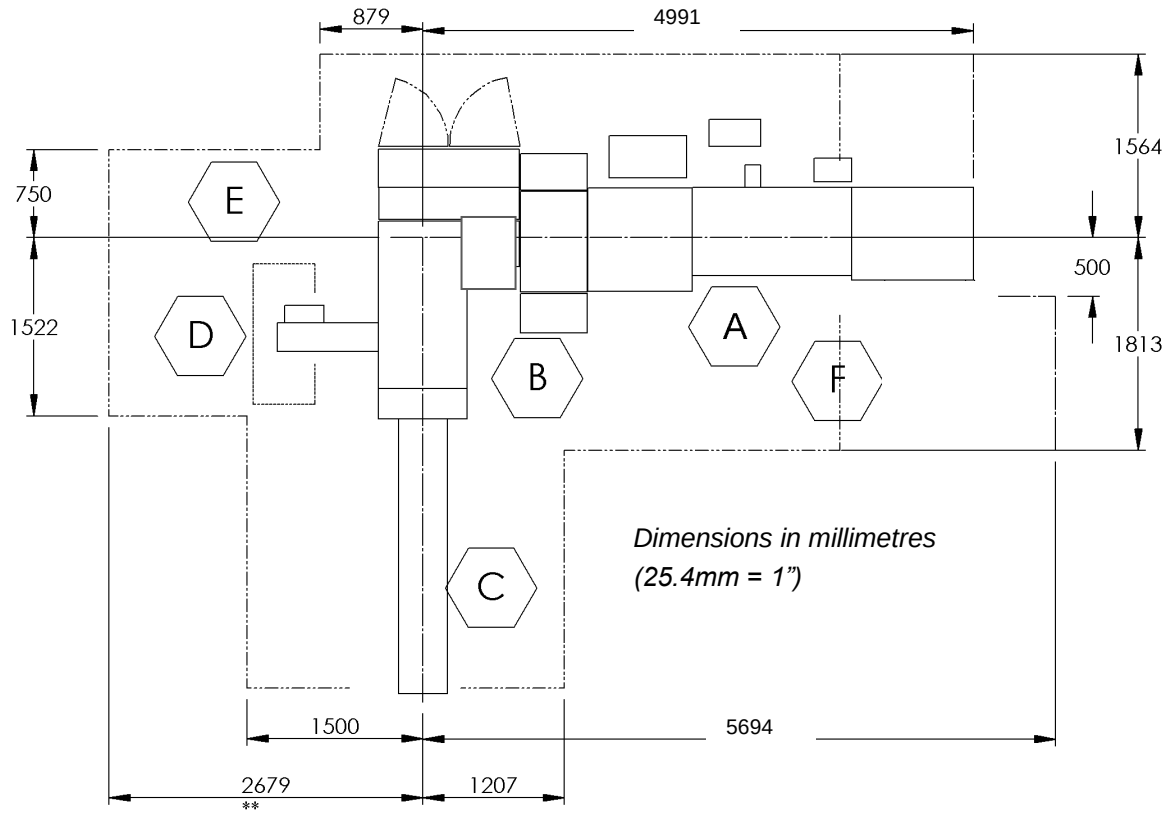
*** Electrical supply positions (one for the Smart-binder, one for pile feeder). 3 metre cables and plugs supplied so customer's power sockets must be within 3meters of these points.

**** Electrical supply position when transformer is supplied (supplies both main Smart-binder and pile feeder). Customer provides wiring to terminals in transformer housing.

++ This dimension increases by 330mm when the DMP-100 perforator is fitted (see Appendix 11).

+++ ISG glue option requires a high pressure air supply.

Plan of Smart-binder in-line/off-line (with SB-097) showing clearance needed around machine.

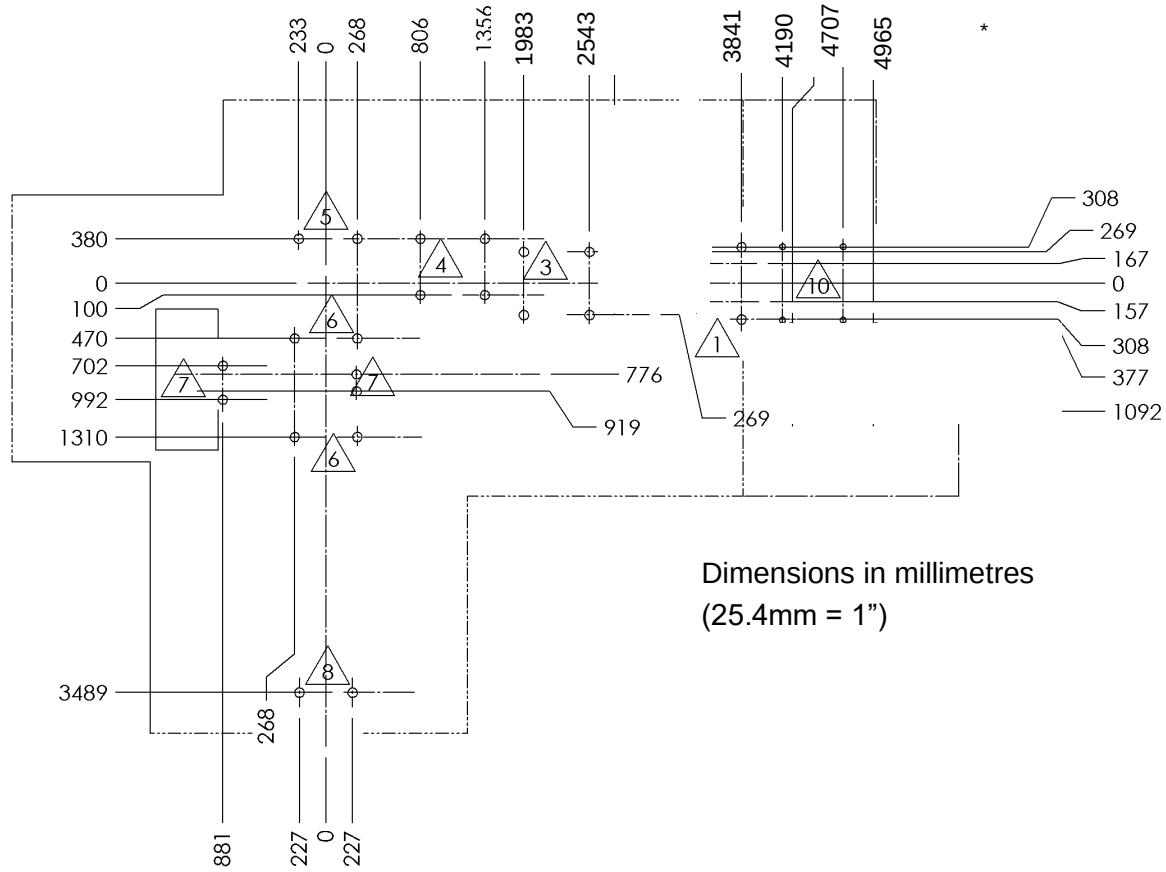


The area within the chain dotted line must be clear of fixed obstructions to allow operator and service access to the machine.

A - Cover loading position
B - Control panel
C - Position for removal of finished books from delivery conveyor
D - Location of waste bin when used with optional trimmer waste removal conveyor
E - Space for removal of saddle skirts (service and maintenance)
F - Sheet feeder loading area

** This dimension is needed to allow space to remove saddle skirts and space to remove the trimmer waste conveyor.

Plan showing floor loadings of all feet of installed Smart-binder in-line/off-line (with SB-097).



Dimensions in millimetres
(25.4mm = 1”)

Feet	Quantity	Maximum static load per foot	
1	2	40 kg	88 lb
2	4	100 kg	220 lb
3	4	140 kg	308 lb
4	4	500 kg	1100 lb
5	4	500 kg	1100 lb
6	2	500 kg	1100 lb
7	4	20 kg	44 lb
8	2	30 kg	66 lb
9	4	100 kg	220 lb
10	4	25 kg	55 lb

Feet are typically 70 mm (2.75”) diameter. Actual loads on each foot are usually much lower, but floor must be able to withstand the loads in this chart.

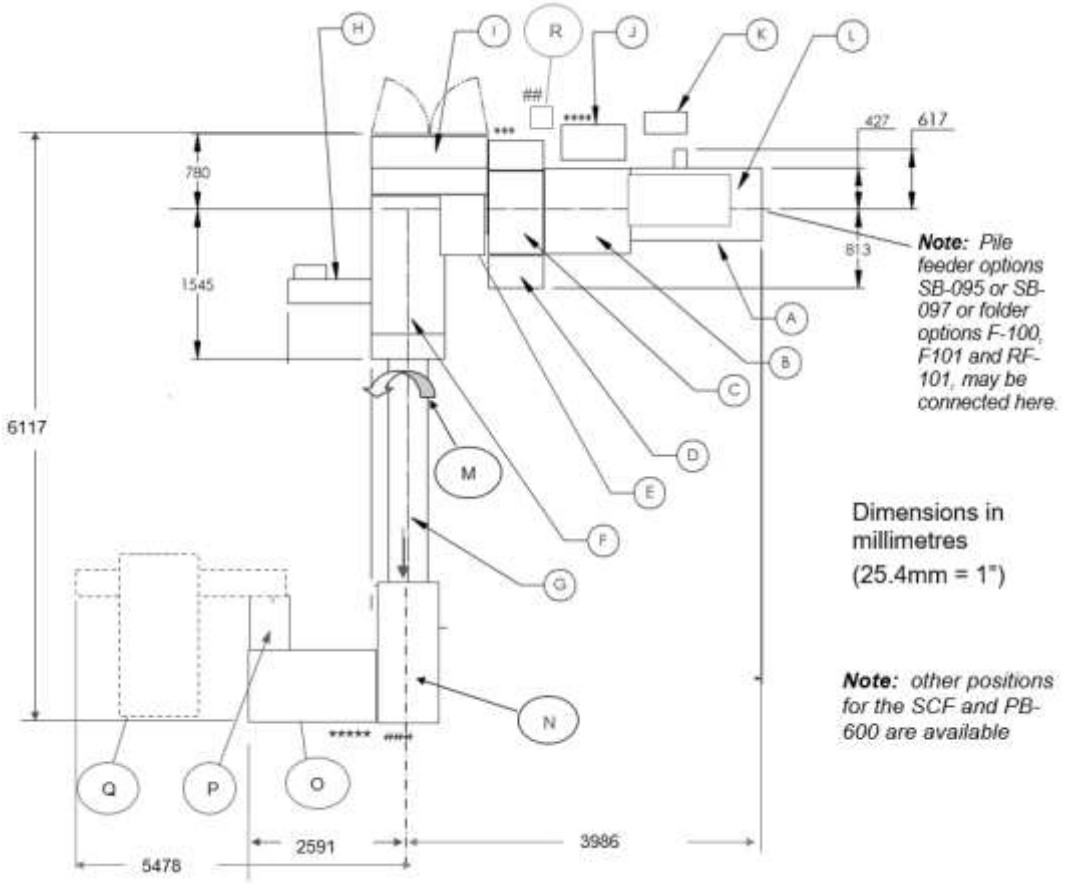
Total machine weight 2100 kg (4600 lb).

Maximum dynamic loads during operation +/- 40 kg (+/- 88 lb) over feet number 6.

During installation machine is moved on wheels, which can apply more concentrated loads than those listed here. This is not usually a problem but can make machine alignment and movement on soft floor surfaces difficult.

17.2.4 Layout of in-line Smart-binder SB- 4 with PB-600B perfect binder and CMT-330 trimmer

Layout option A



Smart-binder system elements			
A	Infeed conveyor	**J**	Optional voltage transformer
B	Scoring and folding	**K**	Cover feeder air pump
C	Sheet collector	**L**	Smart-binder cover feeder
D	Operator interface (for Smart-binder)	**M**	Operator step-over
E	Stitcher (or book pressing)	**N**	SCF (signature collector and feeder)
F	3-knife trimmer	**O**	PB-600B hot melt binder
G	Delivery conveyor	**P**	PB-600B cover feeder
H	Optional trim waste removal conveyor	**Q**	Optional CMT-330 book trimmer
I	Electrical enclosure	**R**	ISG cold glue ##

Machine height: 1350mm (53") with guards closed.

Ceiling height required to allow guards to open: 2500mm (98.5") over trimmer and 2000mm (79") over rest of machine.

*** Electrical supply for the Smart-binder. 3 metre cable and plug supplied, so customer's power socket must be within 3meters of this point.

**** Electrical supply position when transformer is supplied. Customer provides wiring to terminals in transformer housing.

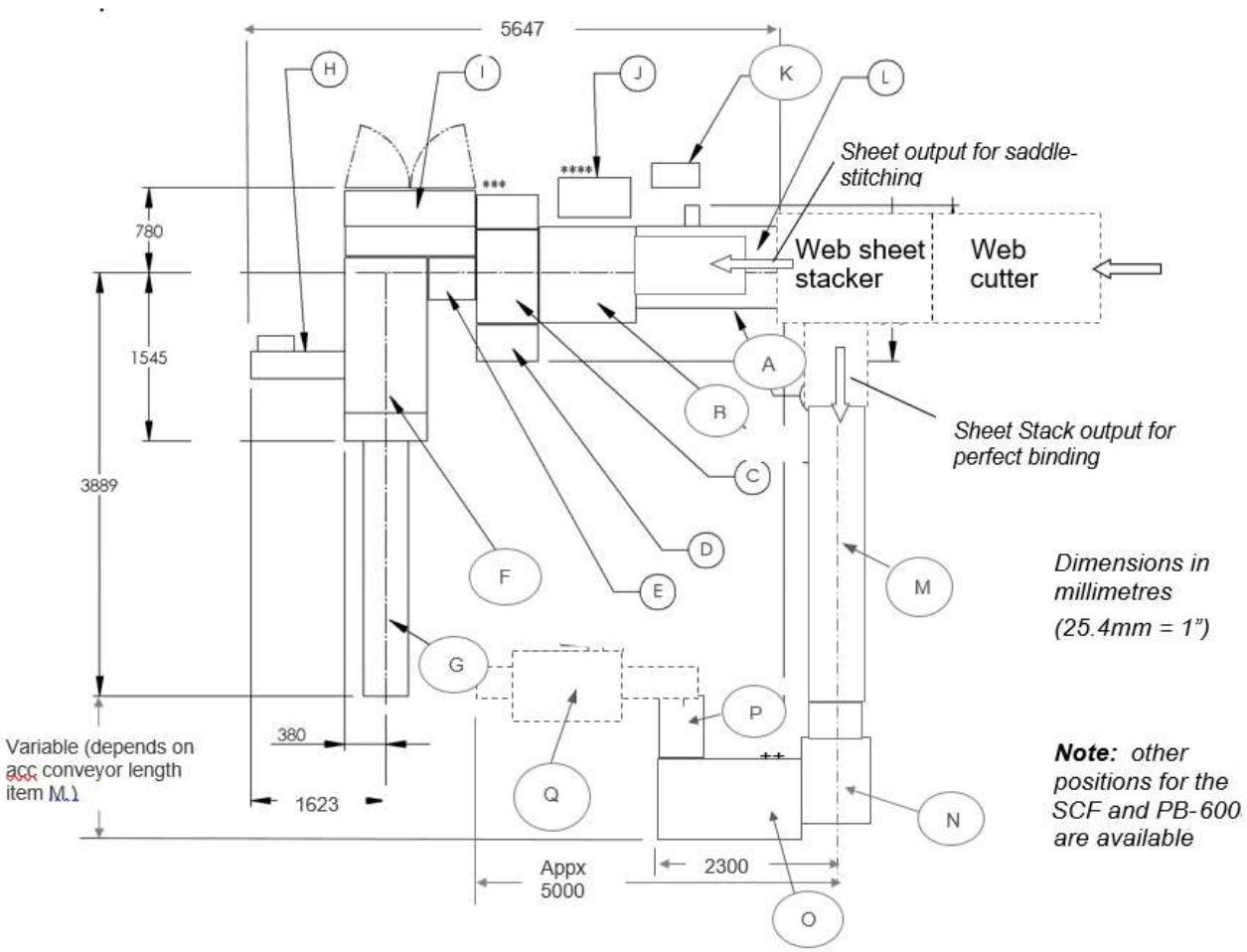
***** Electrical supply for the BB3002

High pressure (filtered) air requirement for ISG gluing

High pressure (filtered) air requirement for the SCF

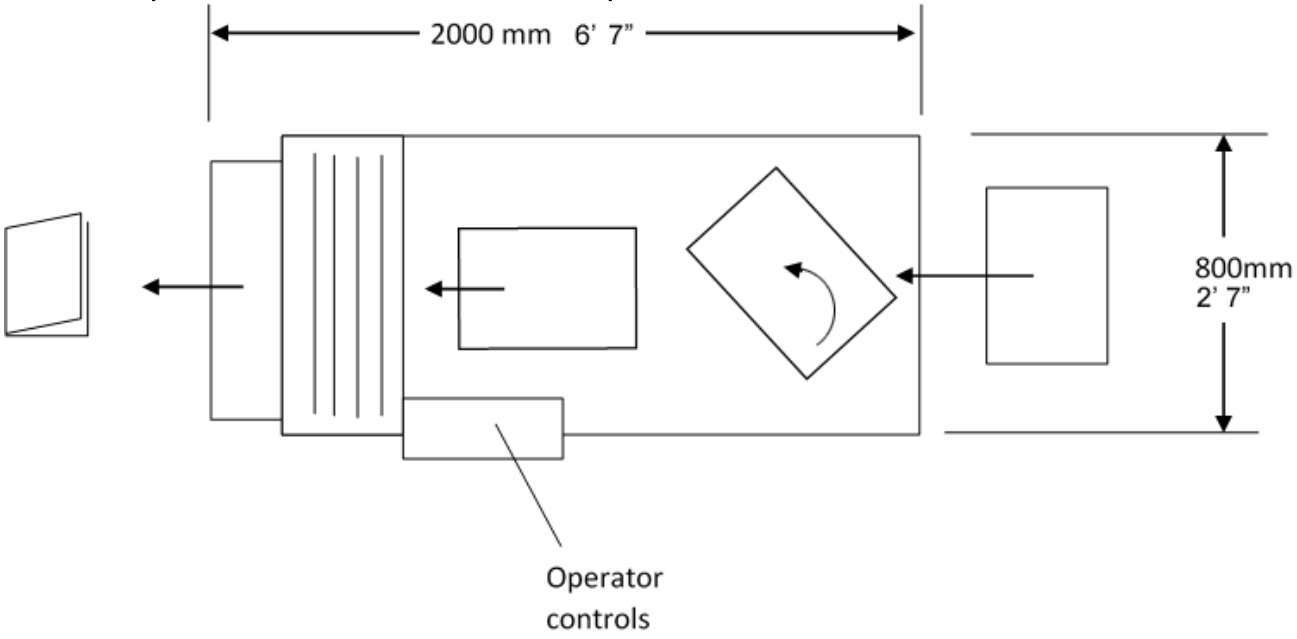
Refer to IBIS for alternative BB3002/ CMT positions.

17.2.5 Layout of in-line Smart-binder SB-5 with PB-600B perfect binder



Smart-binder system elements			
A	Infeed conveyor	**J**	Optional voltage transformer
B	Scoring and folding	**K**	Cover feeder air pump
C	Sheet collector	**L**	Smart-binder cover feeder
D	Operator interface (for saddle-stitcher)	**M**	Accumulator roller conveyor
E	Wire Stitcher	**N**	SSF (signature set feeder)
F	3-knife trimmer (saddle-stitched books only)	**O**	PB-600B hot melt binder
G	Delivery conveyor	**P**	PB-600B cover feeder
H	Optional trim waste removal conveyor	**Q**	Optional CMT-130 thick-book 3-knife trimmer
I	Electrical enclosure		

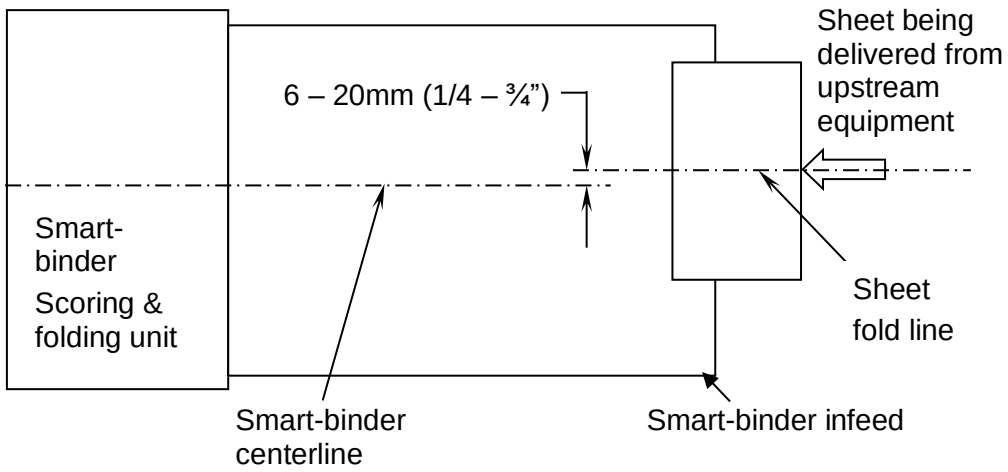
17.2.6 Layout of RF-100 rotator/folder option



***Note**: Refer to IBIS for layout dimensions of other optional modules*

17.3 Connection to upstream/downstream equipment

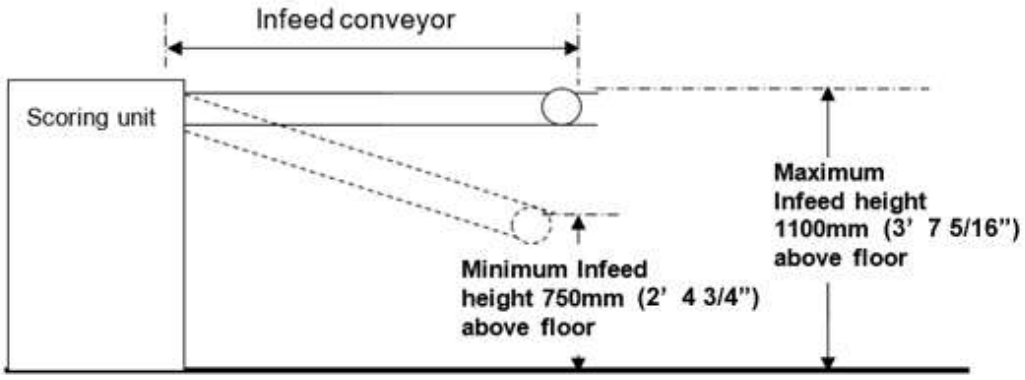
Sheets must be delivered into the Smart-binder infeed from the upstream equipment correctly oriented (usually long edge leading) and with the sheet fold line (normally the center of the sheet) offset from the Smart-binder center-line as shown below.



Note: if changing web width when using an in-line connected Smart-binder and a side-registered web cutter, then sheets must be moved to the side after cutting to achieve the center register needed by the SB folder.

The Smart-binder infeed accepts sheets delivered from the upstream equipment (or the pile feeder in the off-line configuration) at the following heights.

Note: if changing web width when using an in-line connected Smart-binder and a side-registered web cutter, then sheets must be moved to the side after cutting to achieve the center-register needed by the SB folder.



The height of the SB-1, 2 and 3 Smart-binder delivery conveyor at the take-off end is 730mm. A special modified delivery conveyor may be provided if books need to exit at a different height for interface to downstream equipment such as a book stacker or inserter (refer to IBIS for details).

Note: the delivery conveyor on the SB-4 has a higher exit to interface with the SCF and PB-600B perfect binder.

17.4 Smart-binder Factory Services (elect power , compressed air and environmental control, waste removal)

17.4.1 Electrical power requirements

Equipment	Model	Phases	Rated Voltage (V)	Rated Current (A)	Recommended Supply[1] (A)	Operation from 208/220V supply [2]
Smart-binder	SB1,SB2,SB3	3+N	400	16	(US)15/(EU)16	TFR-100 [3]
Pile Feeder	SB095	3	400	5	(US)15/(EU)16	TFR-100 [3]
Pile Feeder	SB097	3+N	400	6	(US)15/(EU)16	TFR-100 [3]
Rotator Folder	RF-100	3	400	3	16	Specify voltage with order
		3	208	6	15	
Folder	F-100	3	400	3	16	Specify voltage with order
		3	208	6	15	
Folder	F-101	3+N	220/400	3	(US)15/(EU)16	-
Buffer	SBS-100	1	208-240	2.5	(US)15/(UK)13/(EC)16	-
SCF-100	SCF-100	1	208-240	2	(US)15/(UK)13/(EC)16	-
Perfect Binder	PB-600S	3	208-415	12	(US)15/(EU)16	-

3 knife Trimmer	CMT-130	3	400	16.5	32	Specify voltage with order
		3	208	20	30	
3 knife Trimmer	CMT-330	3	400	16.5	32	Specify voltage with order
		3	208	20	30	
Stacker	BSS-10	2	208-440	6-3	(US)15/(EC)16	-
Stacker	BSS-11	2	208-440	6-3	(US)15/(EC)16	-
Spine Squarer	SM-100	1	208-254	3	(US)15/(UK)13/(EC)16	-
Insert Feeder	CIF-101	3+N	400	6	16	TFR-100 (3)

Consult IBIS if input voltage is not in the ranges listed above.

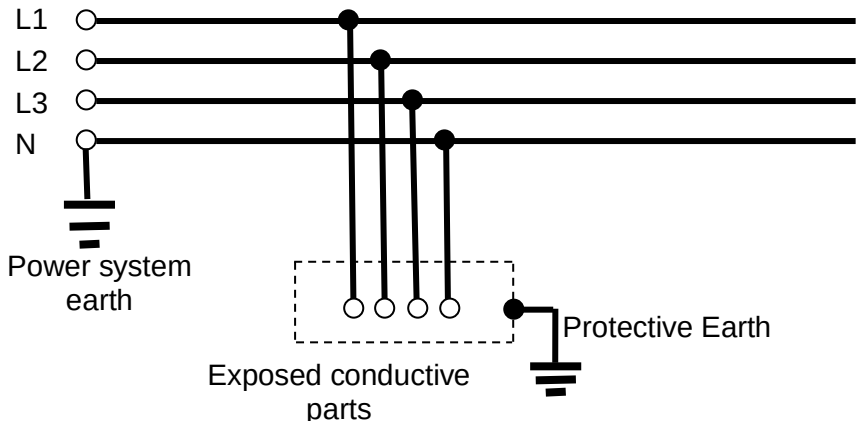
(1) Circuit breakers should be Type C (according to EN60947), or equivalent. Residual current devices (RCD) and Ground Fault Interrupters (GFI) must not be fitted to the power supply as leakage currents from the Smart-binder could cause nuisance trips. Power networks with significant impedance between neutral & ground (known as IT networks) see Appendix 15.1 should not be used to supply any equipment as this can lead to damage in the inbuilt EMC filters.

(2) Equipment marked "–" can operate from a range of supplies, or has inbuilt transformers that can be configured on installation.

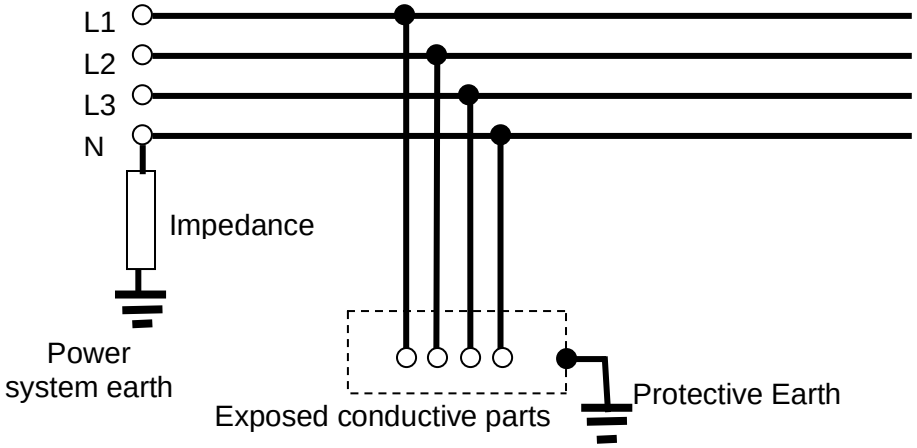
(3) The TFR-100 transformer can supply the Smart-binder plus one of SB-097,SB-095,CIF-101. It requires a 30A supply to be wired to the unit and is equipped with 2 sockets to which the Smart-binder etc can be connected.

17.4.2 Power Distribution Networks (according to EN60950)

1. TN POWER SYSTEM: A power distribution system having one point directly earthed, the exposed conductive parts of the installation being directly connected to that point by protective earth conductors. Three types of TN POWER SYSTEM are recognized according to the arrangement of neutral and protective earth conductors, as follows:
   i. TN-S system: having separate neutral and protective earth conductors throughout the system;
   ii. TN-C-S system: in which neutral and protective functions are combined in a single conductor as part of the system;
   iii. TN-C system: in which neutral and protective functions are combined in a single conductor throughout the system;
2. TT POWER SYSTEM: A power distribution system having one point directly earthed, the exposed conductive parts of the installation being connected to earth electrodes electrically independent of the earth electrodes of the power system.



3. IT POWER SYSTEM: A power distribution system having no direct connection to earth the exposed conductive parts of the installation being earthed.



17.4.3 Compressed air supply requirements

Equipment	Model	Pressure		Consumption		Maximum Flow	
		Mpa	PSI	litre/min	CFM	litre/min	CFM
Smart-binder	SB1,SB2,SB3	0.62	90	3.5	0.1		
Buffer	SBS-100	0.62	90	283	10		
SCF-100	SCF-100	0.62	90	20	0.7		
3 knife Trimmer	CMT-130(1)	0.62	90	142	5		
		0.62	90	142	5		
3 knife Trimmer	CMT-330(1)	0.62	90	255	9		
		0.62	90	255	9		
Stacker	BSS-10(2)	0.55	80	45	1.6	76	2.7
Stacker	BSS-11	0.55	80	85	3		

(1) CMT trimmers require dry, non-lubricated compressed air. The required minimum air quality rating is ISO 8573.1 Class 2.4.2 (solids < 1 micron, pressure dew point < 38°F @100psig, and oil content < .08 ppm). The compressor system must include an air dryer capable of ISO Class 4 or better (pressure dew point < 38°F @100psig). Failure to use dry, non-lubricated compressed air that meets or exceeds the above requirements may cause damage to the machine and will result in machine warranty being voided.

(2) The BSS-10 or BSS-11 stackers require large but intermittent air-flow. Supply pipework must accommodate the maximum flow.

17.4.4 Factory Air conditioning

The Smart-binder environment should be controlled to reduce variability in the behaviour of the paper. This should result in more consistent, reliable operation.

Maintain relative humidity within the range **40-60%** and temperature between **18 and 25ºC (64 and 77ºF).**

Heat output when running

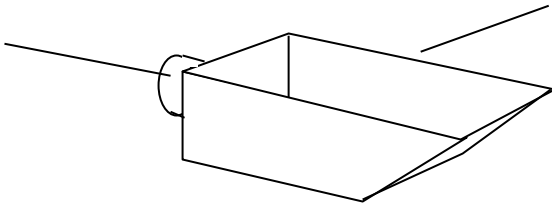
Equipment	Model	Running Heat Output (kW)	(BTU/hr)
Smart-binder	SB1,SB2,SB3	6.7	22860
Pile Feeder	SB095	2.5	8530
Pile Feeder	SB097	3	10236
Rotator Folder	RF-100	0.5	1706
		0.5	1706
Folder	F-100	0.5	1706
		0.5	1706
Folder	F-101	0.75	2559
Buffer	SBS-100	0.5	1706
SCF-100	SCF-100		0
Perfect Binder	PB-600B	4	13648
3 knife Trimmer	CMT-130		0
3 knife Trimmer	CMT-330		0
Stacker	BSS-11	1.5	5118
Spine Squarer	SM-101	0.55	1877
Insert Feeder	CIF-101	4	13648

Standby heat output from each unit is generally less than 250W, with the exception of the PB-600B perfect binder which outputs 1.5kW (5118 BTU/hour) when the glue tank heaters are on (and the PB-1500W: refer to IBIS for heat output).

17.4.5 Trimmer waste (trim-off) removal systems

If the installation sites has pneumatic (vacuum) extraction system for waste paper then it is recommended that this is used to remove waste paper from the Smart-binder trimmer, instead of the waste conveyor TWC-100 or TWC-101. In this case the optional Smart-binder trimmer waste collection chute TCC-100 (part B0001944: see Appendix 28) may be supplied to connect to the external extraction pipe.

Circular outlet diameter 100mm for connection to vacuum extraction pipe.



Option TCC-100 waste collection chute (fits inside Smart-

Consult IBIS for routing and dimensions of ducts.

Alternatively, the optional Trimmer Waste removal conveyor (Option TWC-100 or TWC-101) can be used to conveyor trimmed paper trim-off to a collecting bin (Option TWB-100).

Waste collection bin option TWB-100 (normally customer – supplied)

TWC-100 Optional waste removal conveyor

17.5 Installation, Commissioning and Training

17.5.1 Unloading

- All machines will be delivered on wooden pallets, and either covered or wooden-crated, depending on whether the machine is transported by sea/air or by only by road . See below for dimensions and weights of these crates.

- A Fork Lift Truck, capable of lifting 2.5 Tons (2500kg/5500lb) is required for lifting the largest module of the Smart-binder off the base of the crate and into position. Its forks must be at least 1.5m (59") long (requires fork extensions).

- Each module has castor wheels for easy positioning and screw pads for final location.

- See next page for the dimensions of the largest unit. Ensure that doors, etc. are large enough for this module.

17.5.2 Machine module weights and sizes (crated)

Approximate weights and sizes

The basic in-line Smart-binder SB2 and SB-3 is delivered in 4 separate wooden crates *(Note: if exact weights and dimensions are needed then information should be obtained from IBIS at the time the machine is shipped):*

Crate	Size (L x W x H)		Weight	
	Cm	Inches	Kg	lb
1	206 x 196 x 156	81 x 78 x 61	1150	2530
2	256 x 206 x 147	101 x 81 x 58	638	1403
3	156 x 106 x 150	61 x 42 x 59	350	770
4	156 x 101 x 150	61 x 40 x 59	500	1100

The pile feeders SB-095 or SB-097 are delivered in a separate crate

Crate	Size (L x W x H)		Weight	
	Cm	Inches	Kg	lb
5	180 x 96 x 156	71 x 38 x 61	355	781

Refer to IBIS for weights and dimensions of other optional modules

17.5.3 Smart-binder Module Weights and Sizes (uncrated)

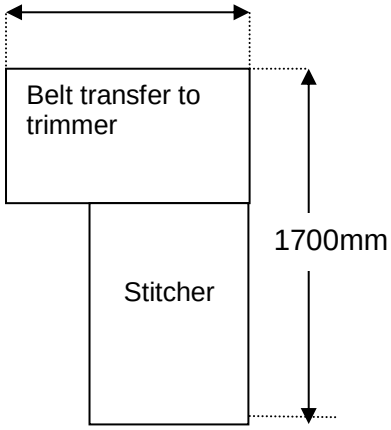
Approximate weights and sizes

Module	Size (L x W x H)		Weight	
	Cm	Inches	Kg	lb
Infeed Conveyor	150 x 100 x 50	59 x 40 x 20	80	176
Scoring / Folding Module	105 x 120 x 130	42 x 48 x 52	275	605
Stitcher / collector Module	192 x 179 132	75 x 71 52	900	1980
Trimmer Module	108 x 80 x 97	43 x 32 x 39	400	880
Delivery conveyor	260 x 53 x 70	103 x 21 x 28	70	154
SCF -100	94 x 105 x 127	37 x 41 x 50	320 est	704 est
Pile feeder (SB-095) for dedicated off-line feeding	80 x 90 x 115	32 x 36 x 46	268	590
Cover feeder air pump	55 x 33 x 29	22 x 13 x 12	35	77
TWC-101 waste removal conveyor	154 x 50 x 103	61 x 20 x 41	50	110
Accessories	30 x 30 x 20	12 x 12 x 8	10	22

17.5.4 Size of largest SB 1,2,3 module (stitcher module)

Excluding packaging

1550mm: normal dimension
1400mm: with drive motor removed
1100 mm: with drive motor and control box removed



Note: *all new installation sites should be checked to ensure that there is room to move this largest module into position*

17.5.5 The Operator Training Course

Machine operators with previous experience of saddle-stitchers will learn to operate the new Smart-binder system more quickly than operators without this experience. Knowledge of operating wire stitching heads, trimming knives and all issues relating to saddle stitch book quality will be of particular value in operating the Smart-binder.

The training program is divided into four sessions. Each session lasts approximately four hours. It is recommended that the course be spread over a 3 or 4 day period

A.	**Introduction**	**Session**
A.1.	Introduction to IBIS and the Smart-binder system.	
A.2.	Distribution of Smart-binder Operator manuals.	
A.3.	Introduction to Safety issues in general.	

B.	**The SMART-BINDER system**	
B.1.	Identification of all elements of the Smart-binder system.	
B.2.	Glossary of terms used in operating the machine.	
B.3.	Overview of general operation of the Smart-binder system.	
B.4.	Review of Safety Issues related to actual machine operation.	
B.5.	How to start/stop the system.	
B.6.	Running demonstration of the Smart-binder in operation.	
B.7.	Review important factors relating to the presentation of sheets from the upstream equipment.	

C.	**Make-ready adjustments**	
C.1.	Adjusting the infeed and collator for different sheet sizes.	
C.2.	Adjusting the push out conveyor.	
C.3.	Review safety issues relating to stitcher and trimmer operation.	
C.4.	Adjusting stitching head and clincher positions.	
C.5.	Adjusting backstops and front stops for different book sizes.	
C.6.	Adjusting side knives for different book sizes.	
C.7.	Adjusting trimmer side joggers for different amounts of trim off.	
C.8.	Review operation of delivery conveyor (book shingling and batch marking).	
C.9.	Carry out make ready adjustments on cover feeder (sheet size and thickness).	
C.10.	Loading and Saving Smart-binder setup.	
C.11.	Review complete make-ready flow chart.	

D.	**Stitching head operation and adjustment**	
D.1.	Review Hohner stitching head operator manual.	
D.2.	Complete stitching head training (view Hohner video if available, how to change wire spools, clear jams, adjust wire length and balance leg lengths, change clincher points, etc.).	
D.3.	Run the Smart-binder with paper and produce stitched and trimmed books.	

E.	**Center-knife installation, setting and operation (if supplied)**	
E.1.	Review safety issues relating to trimmer operation and knife handling.	
E.2.	Fit 4th/5th knife assembly and set to produce good quality trim.	
E.3.	Run the Smart-binder with paper and produce 2-up stitched and trimmed books.	

F.	**Operator maintenance**	
F.1.	Review safety issues relating to trimmer operation.	
F.2.	Carry out knife adjustment to produce good quality trim.	
F.3.	Lubrication (stitching heads and trimmer).	
F.4.	Belt cleaning.	
F.5.	Polycord belt changing and joining	
F.6.	Cleaning sensors.	

G.	**Fault Finding and resolution**	
G.1.	Review possible book quality problems, causes and rectification.	
G.2.	Review possible paper jam conditions, causes, and prevention and jam clearance.	
G.3.	Review fault messages on touch screen.	

H.	**Review of Smart-binder System operation**	
H.1.	Review all machine adjustments needed to control finished book quality.	
H.2.	Run the complete system with a range of different book thicknesses and sizes.	
H.3.	Demonstrate that commercially acceptable book quality can be achieved.	
H.4.	Demonstrate that the operator trainees have been adequately trained and are capable of operating the Smart-binder system in a live production situation (run a typical job, at an adequate quality and efficiency).	
H.5.	Issue training certificates to operator trainees.	

17.5.6 The Smart-binder Maintenance training course

Service-Engineer Training (5 Days) for Smart-binder SB-1, SB-2 or SB-3

Documentation available during training course:

Smart-binder Operator Manual, Smart-binder Service Manual, Smart-binder Parts Manual, Smart-binder Installation Guide, Stitching head manual, Pile feeder operator manual and parts manual and roller table operator manual and parts manual (needed for off-line and on-line/off-line variant only), Smart-binder Documentation CD (includes electronic versions of all the above documents).

Note: the following training syllabus is an approximate guide only. The training subjects may be covered in a different sequence to that shown below.

DAY 1

A.	**Introduction.**
A 1.	Introduction to IBIS and the Smart-binder system.
A 2.	Introduction to Smart-binder manuals and Documentation CD.
B.	**The Smart-binder system.**
B 1.	Identification of all elements of the Smart-binder system.
B 2.	Glossary of terms used in operating the machine.
B 3.	Overview of general operation of the Smart-binder system.
B 4.	Safety issues relating to operating and servicing of the Smart-binder System.
B 5.	How to start/stop the system.
B 6.	Running demonstration of the Smart-binder in operation.
B 7.	Review important factors relating to the presentation of sheets from the upstream equipment.
C.	**Infeed Table.**
C 1.	Adjusting the Infeed for different sheet sizes. Calibrating the Dial.
C 2.	Adjusting the Infeed for straight accurate folding.
C 3.	Ball placement and effects.
C 4.	Belt replacement.
C 5.	Discuss folding position (center fold / off center fold) relating to paper size and barcode.

DAY 2

D.	**Sheet Folding and Scoring.**
D 1.	Setting and adjusting the Nip Rollers.
D 2.	Setting and adjusting the Scoring Rollers.
D 3.	Setting and adjusting the Folding Lane Belts.
D 4.	Polycord Belt welding and replacement.
D 5.	Setting and adjusting the Folding Nip Rollers.
D 6.	Setting the Entry Guides and guide wire replacement.
D 7.	Demonstrate correctly folded and scored sheets.
E.	**Collator**

E 4.	Collator Backstop operation, setting and Dial calibration.
F.	**Pusher / Shuttle**
F 1.	Introduction to Pusher and Shuttle operation.
F 2.	Shuttle timing and Gripper timing (Timing belt replacement).
F 3	Pusher automatic and manual adjustment.
F 4.	Saddle removal.
F 5.	Pusher belt replacement.
F 6.	Pusher Torque Limiter operation and drive belt replacement.
F 7.	Saddle End Stop setting and adjustment (If fitted).

DAY 3

G.	**Stitching head operation and adjustment.**
G 1.	Introduction to Hohner Stitching Head.
G 2.	Setting and adjusting Stitch positions and Lower Guides.
G 3.	Setting and adjusting Stitch pressure and V Clamps.
G 4.	Setting, adjusting and servicing Clinchers.
G 5.	Stitcher Head timing and Clincher timing. (Belt replacement).
G 6.	Complete Stitching Head training (view Hohner video if available), how to change wire spools, clear jams, adjust wire length and balance leg lengths.
G 7.	Fault diagnosis relating to Stitch quality. (Hohner manual)
G 8.	Run the Smart-binder with paper to produce correctly Stitched books.
H.	**Trimmer and Trimmer Transfer**
H 1.	Introduction to Trimmer Transfer and Trimmer.
H 2.	Review safety issues relating to Stitcher and Trimmer operation.
H 3.	Belt replacement on Trimmer Transfer.
H 4.	Setting and adjusting the Upper Transfer Assembly.
H 5.	Adjusting Front Knife and Side Knife Backstops to give ‘square’ books.
H 6.	Adjusting Backstops and Front-stops for different book sizes.
H 7.	Adjusting Side Knives for different book sizes.
H 8.	Adjusting Trimmer Side Joggers.
H 9.	Setting and adjusting the Book Guides.
H 10.	Setting and adjusting the Transfer Nip Rollers.
H 11.	Transfer Nip Roller drive belt replacement.
H 12.	Backstop Drive Belt replacement.
H 13.	Setting and adjusting the Reject Gate.
H 14.	Setting and adjusting the Trimmer Con-Rods.
H 15.	Setting and adjusting the Front knife.
H 16.	Setting and adjusting the Side Knives.
H 17.	Run the Smart-binder with paper to produce correctly trimmed books.
I.	**Center knife (4th/5th knife) installation, setting and operation (if supplied)**
I 1.	Review safety issues relating to 4^{th}/5^{th} Knife and Knife handling.
I 2.	Fitting and setting the 4th/5th Knife assembly.
I 3.	Run the Smart-binder with paper and produce 2-up stitched and trimmed books.

Day 4

J.	**Outfeed Conveyor.**
J 1.	Introduction to Outfeed Conveyor.
J 2.	Batch counting.
J 3.	Book separation.
J 4.	Belt replacement.
K.	**Cover Feeder.**
K 1.	Introduction to the Cover Feeder.
K 3.	Adjusting the Infeed for different cover sizes. Calibrating the Dial.
K 4.	Setting the Pile Guides
K 5.	Replacing the Cover feeder belts.
K 6.	Run the Smart-binder with paper to produce correctly trimmed books with Covers.
L.	**Touch Screen.**
L 1.	Operator Functions and settings.
L 2.	Service Functions and settings.
L 3.	Log Files.
L 4.	PC and PMAC Software Updates.
M.	**Fault Finding and resolution.**
M 1.	Review possible book quality problems, causes and rectification.
M 2.	Review possible paper jam conditions, causes, prevention and jam clearance.
M 3.	Practical Fault Diagnosis including fault insertion tests.
M 4.	Review of Make-ready Charts and carry out sheet length change.
M 5.	Review of Make-ready Charts and carry out Web size change.
N.	**Electrical overview**
N 1.	Function and setting of all sensors.
N 2.	Review all electrical systems.
N 2.	Review all electrical drawings.

Day 5

O.	**Parts replacements, Maintenance & spares kits**
O 1.	Review contents and use of standard Smart-binder accessories kit.
O 2.	Review basic spares kit
O 3.	Review extended spares kit
O 4.	Review use of parts manual
O 5.	Carry out routine maintenance procedures.

P.	**ISG Gluing System**
P 1.	Overview of Gluing system.
P 2.	Operation of Gluing system, sensor and settings
P 3.	Carry out routine maintenance procedures

For off-line Smart-binder only.

Q	**Off-line Pile Feeder.**
Q 1.	Introduction to the pile feeder and offline operation.
Q 2.	Adjusting the feeder for different sheet sizes.

Q 3.	Setting the Pile Guides and Pile Height Sensor and air and vacuum.
Q 4.	Maintenance of sheet feeder.
Q 5.	Run the Smart-binder with paper to produce correctly trimmed books.

18 Frequently asked questions

18.1 In-line or off-line operation?

Does IBIS recommend operation in-line with the digital printer, or off-line from a pile feeder or near-line from a roll unwinder and web-cutter?

Answer: There are many factors to consider when making this decision. However, as a general rule operation in-line with the printer/web cutter or the web unwinder/cutter is recommended if the booklet format size changes infrequently. Off-line operation from a pile feeder is recommended if a range of different book format sizes is needed.

In-line operation may sometimes benefit from use of the optional SBS-100 sheet buffer module. ***See Appendix 10.***

18.2 In-line and off-line operation?

Can a Smart-binder system be configured to run in-line with a digital printer, but also have the capability of being fed from sheets coming from other printers?

Answer: Yes. This is done by selecting the feeder option SB-097 which provides the ability to feed the machine from a sheet pile feeder while retaining the ability to alternatively run in-line from the web cutter. ***See Appendix 7***

18.3 Maximum and minimum book thicknesses

What are the maximum and minimum book thicknesses that the Smart-binder can produce?

Answer: The maximum book thickness is 60mm (2.36mm"). However this is only possible with the SB-4 or SB-5 (using PB-600 or PB-1500 perfect binder). The Smart-binder saddle-binder is limited to 10 mm (0.4") maximum book thickness.

The minimum book thickness is one folded sheet (4 pages), but producing very thin books may require the maximum sheet input rate to be reduced to avoid exceeding the maximum Smart-binder output rate of 116 cycles/min. Good quality paper stock, min 80 gsm (with grain parallel to spine), must be used if running single folded sheets (4 pages) through the Smart-binder to produce a document containing only 4 pages.

The use of options such as Loop stitching (LST-100), Folder (F-100 or RF-100), Center-knife option (CKN-100 or 101) and/or the Spine squaring option (SM-100) will reduce maximum book thickness.

18.4 Maximum Operating Speeds and Efficiencies

What system operating speed and efficiency can be expected?

Answer: The maximum input web speed (in-line or near-line operation) is 130 meters/min without an extra buckle folder (4-page increments) This can be increased to around 150-180 meters/min with extra F-100 or F-101 buckle folder (8-page increments). The F-200 selective folder is available to enable high web speeds while retaining 4 page increments.

The maximum speed when running off-line (from a sheet pile feeder) is around 400 sheets/min (a sheet normally contains 4 –pages, but may alternatively contain 8 or 12 pages if the extra F-100/F101 folder is selected.).

The maximum Smart-binder cycling speed for saddle-stitching is 7,000 cycles/hour or 14,000 books/hour (2-up). The actual booklet output rate is the sheet input rate divided by the number of sheets in the book (excluding a separately-fed cover sheet), providing this does not exceed 7000 cycles/hour (or 5,500 cycles/hr if using the SB-X).

The system efficiency depends on the complexity of the system (how many different elements are in use). For the Smart-binder itself (in-line or near-line), we suggest to plan on an operating efficiency of about 90%, unless it is being used to produce an unusual or difficult job which may reduce this running efficiency. Efficiencies in excess of 90% are achievable with some in-line Smart-binders running straightforward near-line job applications. Efficiencies slightly lower that 90% might be expected for an off-line Smart-binder due to the time needed to reload the feeder.

18.5 Perfect-Bound books

Can the Smart-binder produce perfect-bound books (using hot glue) and what advantages does the Smart-binder have over other systems when making these types of books?

Answer: The SB-4 can create ISG cold-glued 'signatures' containing typically 16- 28 pages (variable) and collect these signatures together before feeding them into the PB-600B or PB-100W perfect binder. Hot-glue (EVA or PUR) is applied to the book spine in the perfect binder and the cover is attached, resulting in very strong books. If the signatures are pre-glued inside using ISG cold-glue, then the spines do not need to be cut off in the binder clamp. This avoids dust/noise being created and makes the process more operator-friendly. The ISG cold glue may in some cases be better than hot-glue for use with hot, dry digitally-printer papers, but may not provide such good adhesion as hot-glue when using heavily coated papers.

The model SB-5 produces conventional perfect-bound books from stacks of loose sheets (hot-glue only).

18.6 Producing small format books in-line with a web printer

How can smaller book format sizes be best produced when running in-line with a digital web printer or from a pre-printed roll?

Answer: Small book formats can be easily produced in-line with a digital web printer by using a web which is double the book width (plus a little extra to allow for trim-off). However this web width may be much narrower than the printer maximum so in this case. It is more efficient for the printer to run a 'wide' web. In this case IBIS offer two different solutions to produce small format booklets from a wide web : see Appendices 14 and 24.

18.7 Light-weight paper stock.

What is the lightest weight paper stock that the Smart-binder can handle?

Answer: Paper stocks as light as 40 gsm are possible, but sheets lighter than 50 gsm must normally be buckle-folded first using the optional in-line F-100/F-101/F-200 folder before entering the Smart-binder infeed or run at much reduced speed. Maximum speeds may have to be reduced if running paper stocks less than 60 gsm without using the extra buckle folder.

18.8 Personalised books

Can the Smart-binder produce personalised saddle-bound books with a constantly changing number of pages (without stopping for adjustment)?

Answer: Yes. The Smart-binder saddle-binder was designed to continually vary book thickness on-the-run and track each page using bar codes to ensure page sequence security. Each book can contain a different number of pages in between 8 and 200 (if using IBIS's unique ISG cold glue binding system) or within a range of about plus/minus3mm (1/8") (if using wire stitching).

18.9 Personalised covers (or covers with cut-out windows).

Can the Smart-binder saddle-stitcher handle personalised book covers?

Answer:. The Smart-binder cover feeder can be fitted with an optional Bar code reader (or 2D code reader) to ensure than each personalised cover sheet contains the same unique book ID number as the content sheets coming from the digital printer. See Appendix 16. If there is a cover mismatch then the Smart-binder will automatically stop and the touch screen will inform the operator of the reason for this stop.

After such a stop the operator must manually recover the correct cover sequence which will cause extra machine down-time. It is sometimes preferred therefore to feed covers with cut-out windows which allow the personalized name and address to show through the window from the digital print on the first inside page. This 'personalizes' the booklet from the outside without requiring a personalized cover sheet.

Optional Cover-matching control systems are also available for the perfect binders.

18.10 ISG cold glue.

What are the benefits and/or risks of using IBIS's unique ISG cold- glue system instead of wire staples to make saddle-bound booklets?

Multi-part answer:

1/ Cold gluing results in a much high page pull strength, particularly on the outside and middle sheets. (However, note that ISG glue strength may be reduced if using coated and non-absorbent papers).

2/ Cold glued books lie much flatter than wire-stitched books because wire-stitching crushes and opens up the book spine, and because the moisture in the cold glue weakens the glue fibres resulting in a much tighter 'set to the fold sheet folds. Flat lying books are extremely important if envelope-inserting these booklets after binding.

3/ Cold gluing is easier to use than wire-stitching because no adjustments are needed when changing book size or thickness.

4/ Cold glued books are easier to recycle compared with wire-stitched books

5/ Cold glued books look better and contain no risk of damage to a child's fingers (as can exist with wire staples).

6/ An optical sensor constantly monitors the glue application and stops the machine immediately if the glue is not being applied to the book

7/ The cold glue system requires less maintenance than stitching heads

8/ Booklets bound with ISG cold glue show evidence of any pages which have been removed by the end-user (if the paper stock is uncoated and absorbent). This can be important when producing insurance documents.

*Note: For these reasons many Smart-binder users **prefer to use ISG cold glue** instead of wire-staples. However, two disadvantages of ISG cold glue are that the bond strength is reduced if used heavily coated paper stocks, and also the booklets may not lay-open so readily (the lay flat is better than wire-stitching but the lay-open is not as good as stitching.)*

18.11 Cost of cold glue

How does the cost of cold glue compare with the cost of wire staples?

Answer: The consumable cost of cold glue is generally similar to the cost of wire stitching (cold gluing is slightly cheaper when making thin booklets and slightly more expensive when making very thick booklets)

18.12 Multiple covers and insert-sheets.

Can the Smart-binder saddle-stitcher change covers automatically on-the run and/or feed insert sheets inside the book?

Answer: The Smart-binder saddle-stitcher may be fitted with two cover/insert feeders : see Appendix 18 . Feeder #2 may be loaded with the next cover while the current cover is feeding from feeder #1.

Alternatively, the additional cover feeder may be used to feed a pre-printed insert sheet at any position inside the book.

Note: if the insert must be in the center of the book (or if it is fed from feeder CIF-101) then there must be a gap large enough between sheets coming from the printer into which to feed the insert.

Note: any inserted sheets will be bound into the book. If a loose insert is required then this must be inserted into the book using a separate post-trimmer inserter machine.

18.13 Frequency of reloading the cover feeder pile

How frequently must the cover pile be replenished?

The answer depends on whether the optional CAL-101 'Cover Autoloader' is fitted or not. Without the Autoloader (see Appendix 3) the maximum pile height is about 20mm, but this increases to about 200mm if the Autoloader is used, thereby greatly increasing the time between reloads. The actual time between reloads depends on the running speed and the average number of pages in the booklets. The thinner the booklet the faster the covers must be fed and the feeder must then be reloaded more frequently.

18.14 Ease and frequency of reloading the sheet pile feeder

How much time is needed to reload the SB-095 or SB-097 sheet pile feeders and how frequently must they be reloaded?

These feeders can accept up to about 5,000 sheets (depending on the paper weight/thickness). The time between reloads depends on how fast the machine is running and the average number of pages in the booklets. Note: the Smart-binder must be stopped to reload the sheet pile feeder. The reload time depends on whether the optional loading trolley system (PLT-100 or HPL-100: see Appendices 6 and 8) is used or not: allow for a few minutes to reload without the trolley system, or about 35 secs with the trolley system (if trolley is already loaded in advance).

18.15 Perforated sheets.

Can the Smart-binder saddle-stitcher produce books with tear-out pages?

Answer: Yes. The optional DMP-100 Dynamic micro-perforator system (see Appendix 11) may be integrated just before the Smart-binder folder. This allows any sheet to receive a perforation (perf) line at any position parallel to the sheet flow direction. A bar-code digit on each sheet controls whether that sheet is to receive a perf line or not. Each perf wheel is individually controlled so a sheet may receive a perf line on one side, but not the other side, or both sides together.

The DMP-101 system offers 4 perf heads instead of 2.

18.16 Hole punching and drilling

Can the Smart-binder produce books with holes?

Answer: Yes. Both hole drilling and (lower cost) hole punching modules are available to be connected on-line with the Smart-binder delivery.

A single corner hold punch (CHP-100) is also available to be installed inside the standard SB trimmer.

See Appendices 22 for further information.

18.17 Loop Stitching

Can the Smart-binder produce books with loop stitches to fit into ring binders?

Answer: Yes. The standard wire stitched heads may be exchanged for loop-stitch heads. In this case the stitcher drive upgrade LSM-100 must also be selected because loop heads require additional drive force.

18.18 Book Stacking and strapping

Can the Smart-binder be fitted with an automatic book stacker and strapper?

Answer: Yes. A variety of stacking, wrapping and/or strapping/banding modules are available for direct connection to the Smart-binder delivery (see Appendices 9 and 29).

18.19 Spine squaring

Can the Smart-binder produce saddle-bound books with spines that have been pressed into a 'square' shape?

Answer: IBIS offer two different types of spine squarer (the SM-101 or the heavier duty ARSD-S-100) that can press book spines into a square shape and can be fitted directly to the Smart-binder delivery conveyor (see Appendices 20 and 21)

18.20 Two-up production

Can saddle-bound booklets be made 'two-up' by using a trimmer center-knife and what are the restrictions when using the center knife?

Answer: Yes. The Smart-binder has an optional center-knife system (0mm or 6.3mm or 9.5mm width) which results in two booklets being delivered side-by-side. The minimum book spine length when using the 9.5mm trimmer center knife is 95mm. The maximum book thickness when using the 6.3 or 9.5mm trimmer center knife is about 3-4mm (5/32") but this can be increased to10mm (3/8") if using the single-bladed center-knife CKN-102. If using the trimmer center knife when wire-stitching, then two extra stitch heads are normally required (See Appendix 15)

18.21 Minimum book format size.

What is the minimum book spine length and minimum book width?

Answer: For normal one-up production the minimum spine length is 200mm. When using the optional center-knife CKN-101 for 2-up production (see above), then the minimum spine length is 95mm. Note: The stretched model SB-X must be used if spine lengths are in between 150 and 210mm.

The minimum book width is normally 119mm, but a special modification SBT-100 is available to reduce this dimension to 82.5mm if required.

18.22 Maximum book format size

What is the maximum book spine length and width?

Answer: The standard Smart-binder can produce a maximum finished book size of 320mm (spine) x 230mm less trim off..

The stretched model Smart-binder model SB-XW can produce a maximum book size of 457mm (spine length) x 273mm (width), less trim off.

18.23 How can the Smart-binder best produce A5 or 5 ½ x 8 ½" booklets ?

What are the different ways in which the Smart-binder can produce A5 or 5 ½ x 8 ½" booklets ?

Answer: The standard Smart-binder can produce A5 or 5 ½ x 8 ½ in landscape format 2-up using the optional trimmer center-knife. The extended model Smart-binder SB-X can produce A5 or 5 ½ x 8 ½ portrait booklets 2-up using the optional trimmer center-knife.

The standard Smart-binder can produce A5 or 5 ½ x 8 ½ in portrait format directly from a narrow web (320mm or 12" width) but it is inefficient for most web printers to print on a narrow web.

The standard Smart-binder can produce A5 or 5 ½ x 8 ½ in portrait format directly from a wide web (450mm or 18") by using either the RF-100 rotator folder (see Appendix 14) or the TUSDC-100 modules (see Appendix 24).

18.24 Trimmer waste removal.

What are the options for removing trimmer waste?

Answer: The normal waste removal system is a simple inclined conveyor which delivers the trim-off paper strips into a customer-supplied collection bin. Two different conveyor systems are available, for delivery into either a small bin (TWC-100) or a large bin (TWC-101)..

If the customer has a factory vacuum waste extract system, then it is preferred to connect the Smart-binder to this instead of using the normal waste conveyor. In this case we supply a waste collection 'chute' with a circular outlet for piping connection to customers extract system.

18.25 Electrical power supply voltage.

What supply voltage is needed for the Smart-binder*?*

Answer: Any 3 phase voltage supply may be used, but voltages outside the 380 – 420 Volt range require the optional voltage transformer TFR-100 to be selected.

18.26 Spine corner tearing on thick books.

How can the normal tearing of the spine corners be avoided when making very thick books?

Answer: The Smart-binder can be fitted with an optional book clamp system (Option TCA-100, see Appendix 17) that reduces or eliminates spine corner tearing. This assembly is customized to suit a particular book width, so the book width must be specified when ordering this option.

18.27 In-line connection to cut-sheet printers.

Can the Smart-binder be used in-line with cut-sheet printers?

Answer: Yes. The Smart-binder SB-1 range is intended for use with slower speed printers, such as cut-sheet printers. A sheet rotator and/or sheet direction changer may be needed in

between the printer and the Smart-binder. Note: Cut-sheet printers normally deliver large sheets short-edge leading and small sheets long-edge leading. The Smart-binder must receive sheets long-edge leading (for normal portrait format booklet production).

18.28 Sheet buffering when running in-line

When running a Smart-binder system in-line with a digital printer, then is it possible to 'buffer' the sheets so that the Smart-binder input speed does not always have to be exactly the same as the Printer speed?

Answer: Yes, we offer the optional SBS-100 buffer for this purpose (see Appendix 10). This SBS-100 module allows some very thin booklets to be produced (if mixed with thicker booklets) without reducing the in-line printer speed. It also allows the Smart-binder to stop and start (i.e. to clear a paper jam) without stopping the in-line web printer.

18.29 Factory climate control

How important is climate control when producing books or booklets?

Answer: The condition of the paper is a critical factor in determining how well a high-speed book-binding system will perform. Factory air conditioning is particularly important when external temperature and humidity is outside the normal range. Hot and dry paper will attract much higher levels of static charge which the environment must be carefully managed. We recommend to maintain relative humidity within the range 40-60% and temperature between 18 and 25ºC (64 and 77ºF).

19 IBIS SCHEDULED MAINTENANCE PACKAGE (SMP)

IBIS offers a Scheduled Maintenance Program (SMP) for all IBIS products. This SMP is based upon scheduled visits by IBIS to the end-customer site.

Why use us to help look after your IBIS equipment?

Our aim is that your IBIS system will always provide the best possible performance and finished book quality. During each scheduled visit we will firstly replace all parts which are recommended to be changed at specified intervals as part of Preventative Maintenance (PM). Doing this prevents unscheduled machine down-time at a later date. At the same time our experienced IBIS technicians will check the machine over generally to see whether any other parts need replacing or adjusting.

During each visit we will inform you about the latest performance upgrades, discuss with the machine operators any specific issues they have and provide advice and assistance in these areas.

The SMP package includes all scheduled visits, software upgrades and all PM parts.

Scope of the IBIS SMP program

During each SMP visit the IBIS technician will:

- Replace all parts which should be changed at regular time intervals (Smart-binder preventative maintenance).
- Check over the machine generally, ensure everything is correctly set up and adjusted and identify whether any other parts need replacement.
- Install any software upgradesto keep the Smart-binder up-to-date and discuss the availability of possible hardware upgrades.
- Ensure that the machine is performing correctly and meeting the customer’s requirements.
- Provide additional help that may be required by the machine operators.
- Discuss any additional requirements that the customer may have.

19.1.1 Frequency of visits

It is recommended that an IBIS technician visits each Smart-binder every 3, 4 or 6 months. This choice of visit frequencies is offered to suit different customer needs.

19.1.2 Duration of visits

The normal visit duration is 2 days for the 3,000 hr, 6000 hr and 9,000 hr visits, with some additional days added on for the 12,000 hr visit (for fitment of the extra preventative maintenance parts needed).

19.1.3 SMP Price

Refer to IBIS for an SMP price quotation

19.1.4 Scheduling of SMP visits

SMP visit dates must be agreed between IBIS and the customer at least one month in advance. If this visit date is changed by the customer within one month of the scheduled visit date then we will attempt to accommodate this change, where possible. However, any extra costs relating to re-scheduling may be charged to the customer.

19.1.5 Replacement parts

Components will be changed as part of IBIS's published preventative maintenance schedule. The maintenance parts list may be modified by IBIS based on additional field feedback in future. The parts required for each SMP visit (for pre-planned replacement) will be sent by IBIS, at IBIS's expense, to be on the customer's site before the arrival of the IBIS technician (or parts will be hand carried by the IBIS technician).

19.2 Conversion Charts For Stock Weights

BOND lb/500 sheets 17" X 22"	BOOK OR OFFSET lb/500 sheets 25" X 38"	COVER lb/500 sheets 20" X 26"	METRIC Grams/metre^2 (gsm)
11	27	15	40
12	30	17	45
13	34	18	50
16	41	22	60
19	47	26	70
21	54	30	80
24	61	33	90
27	68	37	100
35	88	48	130
43	108	59	160

Stock weight as a function of the number of pages in the finished book

Stock Weight			Approximate number of pages	
Gsm	**Pounds Offset**	**Pounds Bond**	**7mm thick book**	**10mm thick book**
60	40.6	16	172	232
70	47.3	18.6	148	200
80	54.0	21.3	128	176
90	61.0	24.0	116	156

Number of pages excludes separate covers.

High volume (low density) paper stock will give a thicker book.

19.3 Tools and Special Equipment Required for Service and Maintenance

Routine Service and Maintenance Operations:

Allen Keys - 1.5, 2, 2.5, 3, 4, 5, 6, 8,10mm (3/8”) ball ended

Combination (ring and open ended) spanners - 6, 7, 8, 10, 13, 16, 17, 19, 24 A/F hexagon

Adjustable spanner, about 200mm, 8” long

Plastic faced hammer

Side cutters (small, flush cutting)

Screwdrivers

- Very small flat bladed (about 2mm, $^{5}/_{64}$” tip)
- Small flat bladed (about3mm (1/8”), ⅛” tip, parallel shank)
- Medium flat bladed (about 5mm, $^{3}/_{16}$” tip)
- Very large flat bladed (about 12mm, ½” tip)
- Small Philips (number 1)
- Medium Philips (number 2)

Craft knife and blades

Fine nose pliers

Normal pliers (medium)

Circlip pliers (inside and outside)

Steel rule (300mm/12”)

Tape measure (3m, 10’)

Torch

Inspection mirror

Emery paper (medium, fine and very fine)

Fine files (square, flat, round and half round, about 200mm, 8” long)

Electrical Fault Finding and Repairs:

Multi-meter

Wire strippers

Small soldering iron and solder

Software or Control System Problems:

PC keyboard and mouse (with USB or PS2 type connectors)

USB memory key (64MB or larger)

The following equipment is only needed for certain rare fault conditions: It is not needed for routine maintenance or rectifying any common faults.

Laptop PC with CD drive, serial port and network adapter

USB 2 Cable, Standard USB A to USB B connectors.

Special cable to connect PC serial port to Siemens servo drives (plus Siemens servo drive software which is supplied with machine)

Crossover network cable to connect laptop to PC (RJ45 connectors, cat. 5 UTP cable)

19.4 Smart-binder (SB) Application Questionnaire for Digital Print Applications.

The following questionnaire may be used to help determine suitability and specification of Smart-binder for a digital print finishing application requiring stitched or glued booklets

Note: refer to IBIS for separate questionnaire if perfect-bound books are needed

Questions		Answers
How would you prefer the saddle-stitcher to be fed:	a) **In-line:** with a digital printer and web-cutter *(if so what type of printer and what type of web-cutter and roll-unwinder - and what is the maximum web speed?)*	
	b) **Near line:** from a roll-unwinder and web-cutter? *(if so what type of web-cutter and roll-unwinder - and what is the maximum web speed)*	
	c) **Near-line or Off-line:** from a roll unwinder and web-cutter, and also with the sheet pile feeder SB-097 *(if so what type of web-cutter and roll-unwindr and what is the maximum web speed (for nearline) and maximum sheet feed rate (for off-line)*	
	d) **Off-line:** from a sheet pile feeder (dedicated off-line operation (info SB-095)	
Cold glue binding	Is ISG cold glue binding required (ie SB-3 model) in addition to conventional wire stitching? (info ISG-100)	
Booklet size and type Booklet type	What finished booklet sizes are required. Are they in 'portrait' or 'landscape' format. What is the size of the printed sheets that will enter the saddle-stitcher (x mm x y mm)?	
	What type of booklets need to be produced?. Please provide as much information as possible	
Speed	If sheets are to enter the saddle-stitcher directly from the web-cutter, what will be the maximum paper web speed?	
Frequency of format size change	How often will the format size change (times per day)?	
Booklet thickness	What will be the maximum, minimum and average number of pages in the finished booklets?	
Number of pages variation	Will the number of pages continually vary between one booklet size and the next?	
Web width	If sheets are to enter the saddle-stitcher directly from the web-cutter what will be width of the paper width?	
Paper weight	What will be maximum and minimum paper stock weights to be used?	
Printed codes	Will sheets have a standard bar-code or 2DDatamatrix codes printed on them (needed for saddle-stitcher control)?	

Cover feeder	Is the optional cover feeder required to feed a separate cover onto the outside of each booklet? (info CIF-102)	
	Is the optional cover code reader needed to 'match' the cover to the inside sheets (personalised booklet production).	
	What will be the maximum and minimum cover stock weights to be fed? Will covers ever have cut-out windows? Will covers ever have 'gate folds' or 'flaps'?	
Productivity	How many booklets need to be produced in a given time period?	
Waste removal conveyor	Is a factory vacuum paper waste extraction system available to remove waste paper from the trimmer?	
Other options required	What other options are required? All IBIS saddle-stitching options are listed on our webpage: IBIS optional modules	
Custom requirements	Do you have any other special application requirements (customized machine modifications)?	

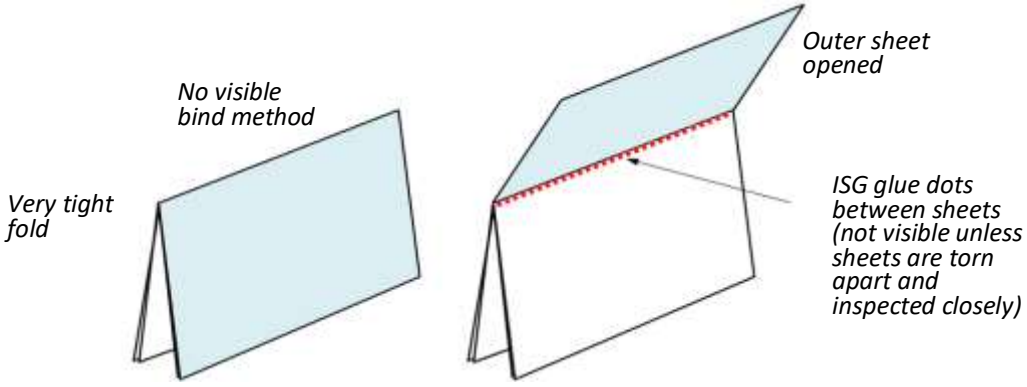
Appendix 1:
Optional ISG 100 cold gluing

The Smart-binder may be supplied as model SB-3 which also includes **IBIS's unique ISG cold glue binding system.**

This system produces a "stitchless" book which has better lay-flat qualities than a wire-stitched booklet, as illustrated in the photo below. The lay-flat difference is less pronounced when making thin booklets.

Booklets with ISG cold glue (left) and conventional stitching (right)

The ISG cold-glue 'nozzle' applies a row of cold-glue 'dots' (or a continuous glue line) to the inside of each folded sheet as it passes through the Smart-binder folder. Sheets are then collected on top of each other (on the saddle) and pressed together tightly when they reach the stitching station (the stitching heads are inhibited when cold gluing, or replaced with a pressing 'anvil').

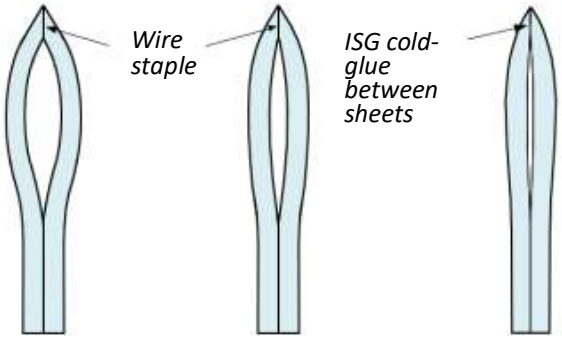


The many advantages of ISG cold-gluing over conventional wire-stitching include:-

- ISG glue gives **higher page pull strength** on the outer and inner sheets
  Note that the paper bond strength when using ISG gluing is linked to the integrity of the paper surface. Higher strength results from more absorbent papers. Certain toners may weaken the bond strength if applied to the same area as the ISG glue (the sheet fold)
- **ISG gluing results in a tighter fold,** particularly on thicker books. This is because wire stitching tends to 'open up ' the book and the moisture in the cold glue softens the paper fibers and helps give a tighter 'set' to the fold
- The ISG gluing process allows the **number of pages in the book to be changed** between minimum and maximum on-the-run without any adjustment (wire stitching requires stitch head pressure adjustments)
- ISG gluing allows the **book format size to be changed** without adjustment (wire stitch heads may have to be moved to a different position when changing book lengths).
- The ISG cold-glue is a **"maintenance-free"** system which is easy to operate than wire stitch heads
- Cold-glued books can be **recycled** more easily than books containing wire staples
- Glue binding avoids any **child safety** (finger damage) issues relating to the edges of wire staples
- Glued books can sometimes be **mailed directly**, unlike wire-stapled books
- ISG cold glue costs approximately the same in **consumable material costs** (on a 'per book' basis) as wire stitches (and much less than hot-melt EVA adhesives used for conventional 'perfect-binding')

ISG Cold-Glue Application Nozzle on the Smart-binder

Thick-book cross-section comparisons: Wire-stitching vs. ISG cold-gluing



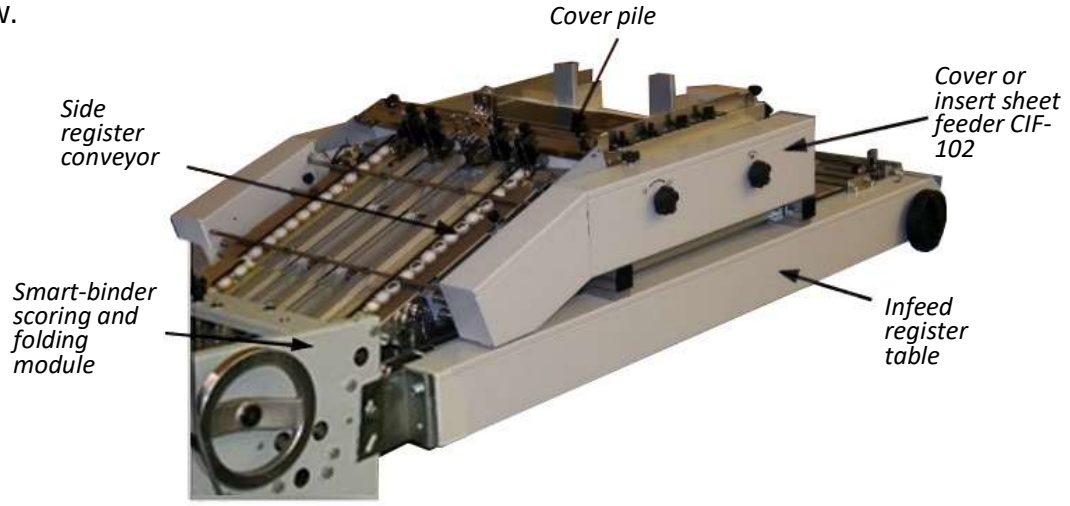
1) Using stitch/fold /trim process ***(conventional booklet-maker)***

2) Using individual sheet folding prior to wire stitching ***(All Smart-binders)***

3) Using individual sheet folding prior to ISG cold-gluing ***(Smart-binders SB-1G, SB1-G4, SB-3 and SB-4)***

Appendix 2:
Optional Cover feeder CIF-102

The **CIF-102 Cover/Insert Feeder** is designed to feed separately printed booklet covers or 'insert sheets' as part of a booklet assembled by the IBIS Smart-binder. The CIF-102 is mounted on slide rails over the Smart-binder infeed register table, and will feed a cover/insert at the appropriate place in the sheet stream passing below.



CIF-102 cover feeder

The CIF-102 feeds sheets from the bottom of the pile using a rotating vacuum wheel. Air-blow nozzles mounted at the sides and rear of the feeder help separate sheets from each other in the pile. Covers/inserts may be reloaded on-the-run without stopping the Smart-binder.

The maximum pile height in the CIF-102 feeder is about 20 mm. This may be increased to about 200mm with the addition of the optional Autoloader CAL-101.

Covers (or inserts) are independently side-registered so that their width does not have to be the same as the width of the digitally-printed 'content' sheets. However the covers (or inserts) must be the same length as the sheets on to which they are fed (same spine length). Covers or inserts that are longer or shorter than the other sheets in the book will cause some loss of print registration between sheets.

If running covers with cut-out windows, then IBIS can supply an extra part (made to suit the dimension of the window) to assist feed and prevent the windows in the cover being fed catching on the window of the cover above.

After side register, then covers (or inserts) enter the Smart-binder scoring and folding module. **Scoring pressure** may be adjusted to minimize color-toner cracking. However, the optimum way to eliminate cracking is to **pre-crease** the covers.

A **bar-code reader** is available for the cover/insert feeder if feeding **personalized** covers or insert sheets. The cover/insert feeder will then compare the unique ID number in the cover/insert barcode to the ID number in the barcode on the incoming sheets. The Smart-binder can be programmed to either stop on a mismatch, or reject the booklet (without stopping) via the trimmer reject gate. The standard bar code reader is option BCR-105. Choose the 2DDatamatrix reader DCR-101 if the 2D codes are to be used.

The cover and insert feeder CIF-102 is capable of feeding sheets in the range **70 – 230 gsm** (47 – 154lblbs. offset or 19 -61lblbs. bond). Covers outside this weight range should be tested before use to check feeding performance.

If feeding covers or inserts from the CIF-102 feeder and making **ISG cold-glued books**, then there must be sufficient space between the last sheet of one book and the first sheet of the next book into which to feed the cover or insert sheet. If running in-line with a high-speed digitally-printed web, then this may mean that the web cutter must be programmed to pause momentarily,to create this gap. If feeding from a pile feeder, then the gap in sheet feeding can be created automatically by the Smart-binder feeder control system. This gap is also required if feeding an insert sheet into the center of a booklet (center-spread).

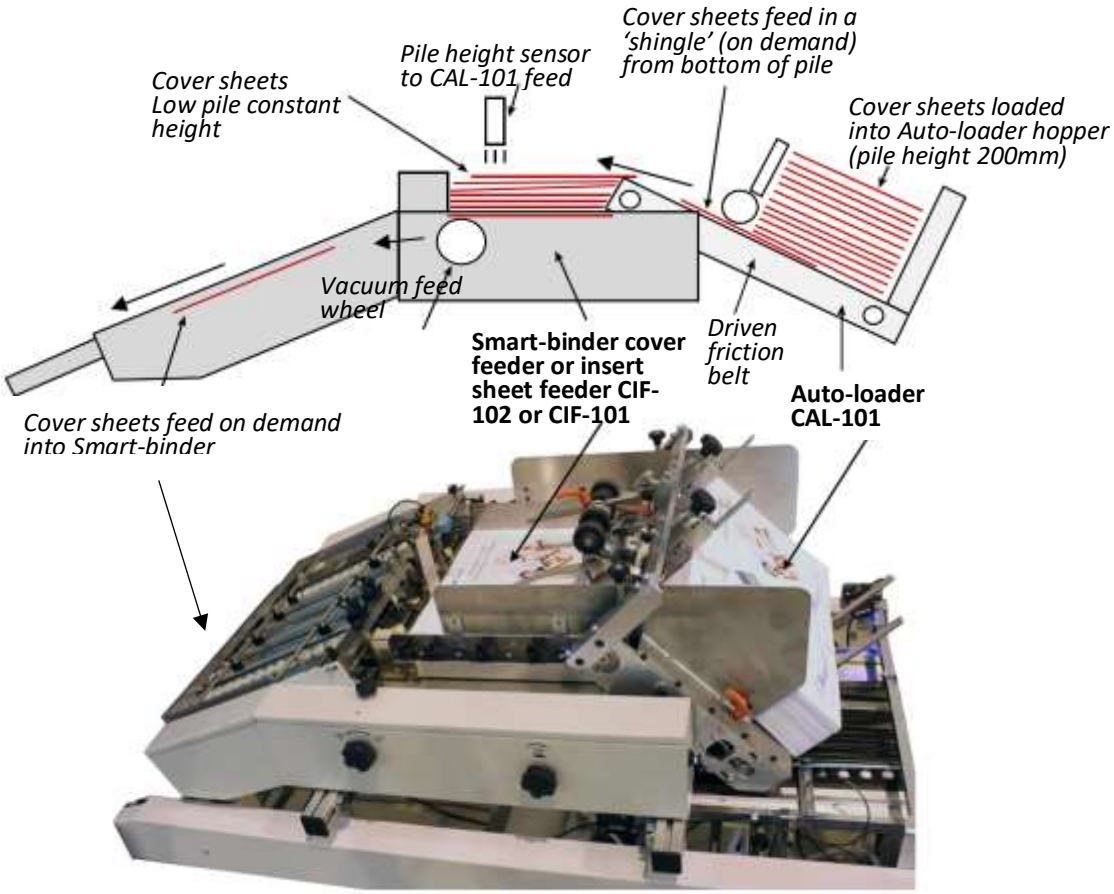
A **dual cover feeder system** may be fitted (one behind the other: CIF-102 + CIF 101) if wishing to feed both an insert sheet in addition to a cover sheet, or if wishing to split cover feed between two feeders.

Covers with **tear-off perforations** may be run depending on the type and position of the perforations. Check with IBIS first if wishing to feed perforated covers. Note that an optional ‘dynamic’ micro-perforation system (option DMP-100) is available for installation just before the Smart-binder folder. This may be used to automatically perforate covers (and/or all other sheets within the booklet) if not already pre-perforated.

Covers with ‘**gate’ folds** (or ‘wing’ folds) have an extra folded „flap" on one or both sides which make them difficult, or in some cases impossible, to feed. These types of covers may contain 6 or even 8 printed pages.

Appendix 3:
Optional Cover Auto-loader CAL-101

The optional CAL-101 'Auto-loader' is available as an add-on for the cover/insert feeders CIF-101 and CIF-102. The Autoloader increases the number of covers of inserts that may be loaded into the feeder from 20mm to 200mm pile height. This greatly extends the time between reloads and also improves the feed reliability:



The operator may load a large quantity of covers or insert sheets (up to 200mm pile height) into the CAL-101 Auto-loader. The sheets feed out automatically from the bottom of the Auto-loader in a 'shingled' stream. The pile height sensor automatically advances the CAL-101 Auto-loader friction belt when more sheets are needed in the feed hopper.

The pile height in the feed hopper remains at a constant low level, which improves feed reliability by avoiding excess pressure on the bottom cover when a new stack of covers is loaded.

Note: The Auto-loader may not be able to feed inserts or covers with cut-out 'windows' (sheets with windows should be loaded directly into the cover/insert feeder).

Appendix 4:
Optional trimmer waste removal conveyor TWC-100/101

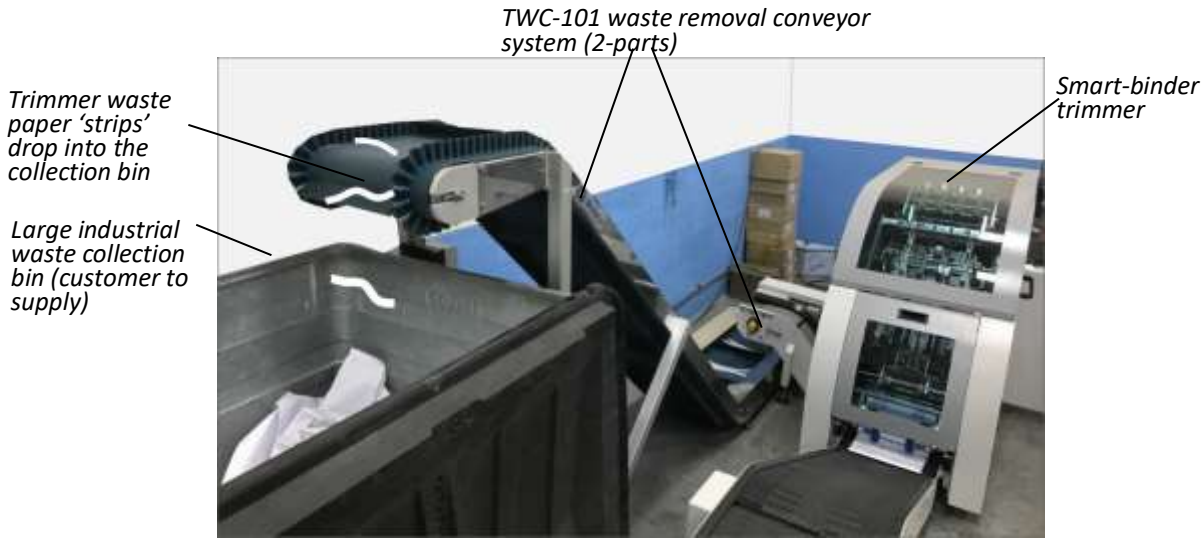
The preferred way to remove trimmed off paper strips from the Smart-binder is to connect to the customer's **centralized vacuum waste extraction system** (for which IBIS can provide a connection chute option TCC-100 with a circular outlet). However if this is not available then the optional **TWC-100 or TWC-101 waste removal conveyor** must be selected.

TWC-100 waste removal conveyor ('low level' for delivery into a small collection bin)

The waste conveyor delivers the paper strips at a height of 940mm (37") into a collection bin which is normally customer-supplied. The recommended dimensions of this collection bin are approximately: L: 1000mm (39") W: 750mm (29.5") H 600mm (23.5").

See next page for the high-level delivery waste conveyor, TWC-101

The TWC-101 (as shown below) is a larger '2-part' removal conveyor which delivers trimmer waste up to a high elevation into an **'industrial' waste collection bin** with wheels (such as the Continental 1100 with 1100 liters capacity).

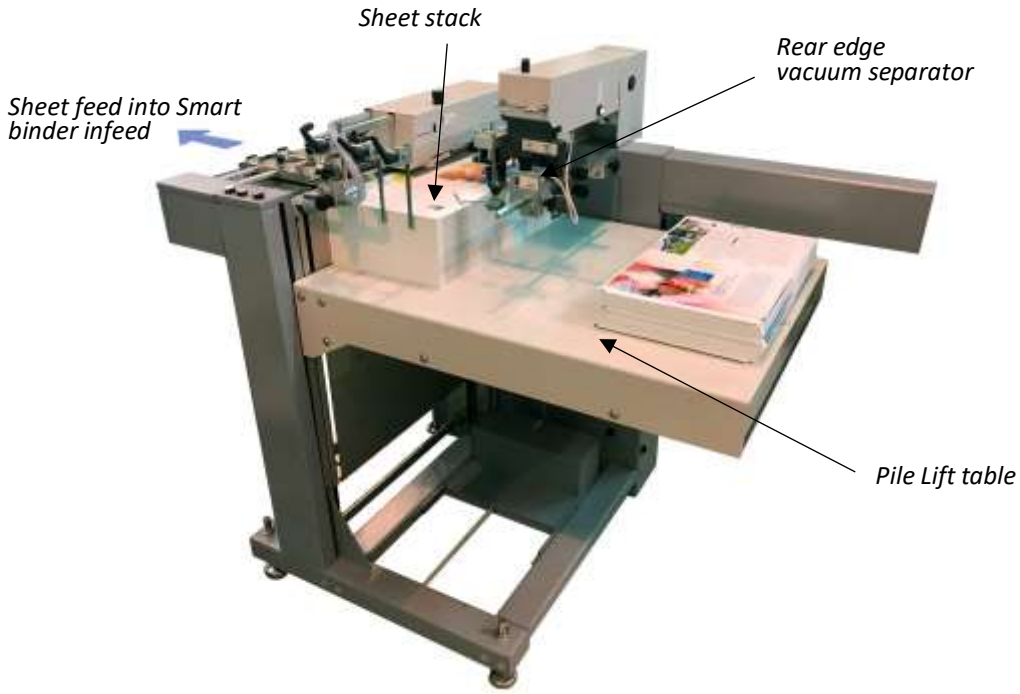


This collection bin is to be supplied by the customer and is located next to the Smart-binder delivery conveyor. The maximum height of this collection bin ('wheelie-bin') is 1400 mm.

The TWC-101 is recommended over the TWC-100 for all high production applications, since the larger bin needs emptying less frequently. Use of the TWC-101 also slightly reduces the overall machine length compared with use of the TWC-100, because the collection bin is next to the book delivery conveyor.

Appendix 5: Sheet Pile Feeder SB-095

The direct-connected pile feeder SB-095 is an integral part of every off-line version Smart-binder.



The feeder may be loaded with piles of pre-collated sheets and optional loading trolley options PLT-100 and HPL-100 are available to assist loading the maximum pile height is approximately 550mm (21.65”) but actual pile heights depend on a number of factors including the amount of toner used (the top sheet must remain relatively flat).

The feeder must be stopped to reload the pile. Allow about 5 mins to reload without using the optional loading trolley, or approximately ½ min if using the loading trolley PLT-100. Each sheet requires a code printed on the edge.

Sheet feed rates up to approximately 400 sheets/min may be achieved. However high sheet feed rates are dependent on:

- The top of each feeder pile must be flat and level (no excessive toner, ink or NCR build-up on any part of the sheet)
  Note: This may reduce the maximum pile height in the feeder as smaller piles may have to be used to keep the top flat

- The sheets in each pile feeder must all be the same size and to ensure reliable feed the trailing edge of the sheets in the pile must be registered together within 0.5mm variation

- The sheets and covers must be free of static charge (steps must be taken to reduce static charge applied in the upstream printing equipment)

- The sheets must not have been processed in a way that causes them to stick together

- The machine operator must have paper handling experience and must have received training form IBIS in the operation of the sheet feeder

Sheet stock weights in the pile may vary by up to a factor of about 'two'. This means for example that the pile may contain 160 gsm covers mixed in with 80 gsm 'content' sheets. Greater stock weight variations may be possible but require testing to establish feed reliability.

Appendix 6:
Optional Pile Loading Trolley PLT-100

The **pile loading trolley PLT-100** for Smart-binder pile feeders (SB-095 or SB-096) provides a fast and simple way to load large piles of sheets into the off-line Smart-binder sheet-feeder. Note: The PLT-100 cannot be used with the pile feeder SB-097.

The PLT-100 trolley system reduces the pile reload time from about 2 minutes to about 35 secs and thereby increases the overall Smart-binder running efficiency by about 10%.

Smart-binder sheet pile feeder (modified to accept loading trolley)

Pile feeder includes rubber guide wheels which guide the trolley accurately into position and a quick 'latching' system to hold it securely

Loading trolley PLT-100 with a pile of printed sheets. The trolley includes adjustable side guides for pile stability while being moved.

Wheels for easy trolley movement

Trolley used to transport sheets to the pile feeder

Trolley handle is easily removed after location in the pile feeder

Trolley now becomes the sheet 'pile lift table' and rises automatically as sheets are fed from the top of the pile.

Trolley engaged with sheet feeder

It is recommended that at least **two loading trolleys** are used per Smart-binder. Trolley #2 can be loaded with the next pile of printed sheets, while Trolley #1 is engaged with the feeder and feeding sheets into the Smart-binder.

If Trolley #2 is already loaded with the next sheet pile this reduces the Smart-binder reload time to about 35 seconds.
Retro-fit of the pile loading trolleys in the field is difficult, requiring modifications to the pile feeder. Please refer to IBIS.

Appendix 7:
Optional sheet pile feeder SB-097

The in-line **Sheet Feeder (option SB-097)** is available to allow a Smart-binder which is fed from a web-cutter to also be fed from piles of cut-sheets which are loaded into the feeder.

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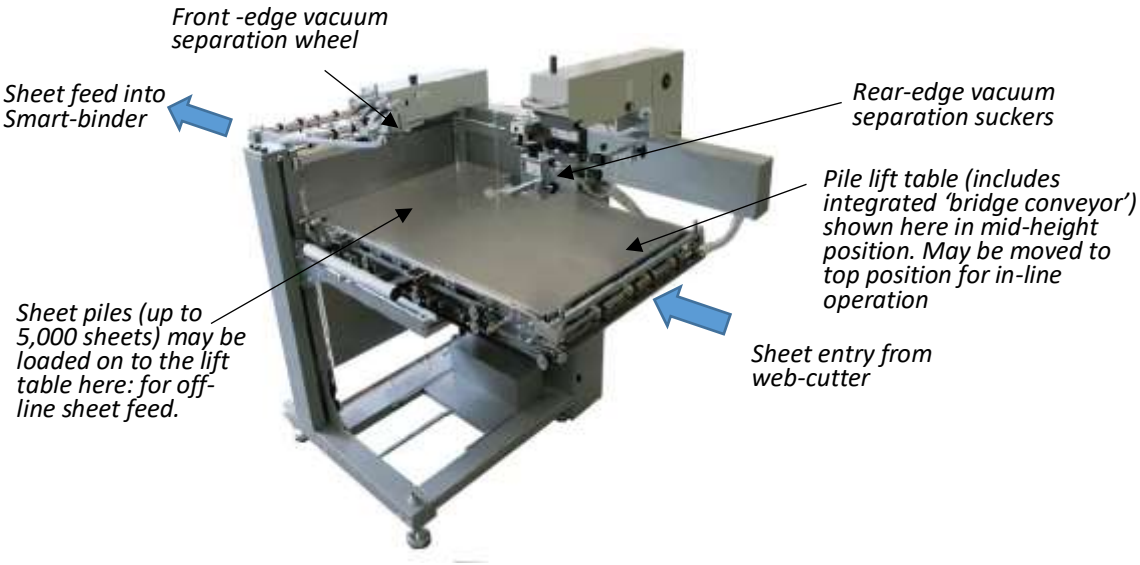
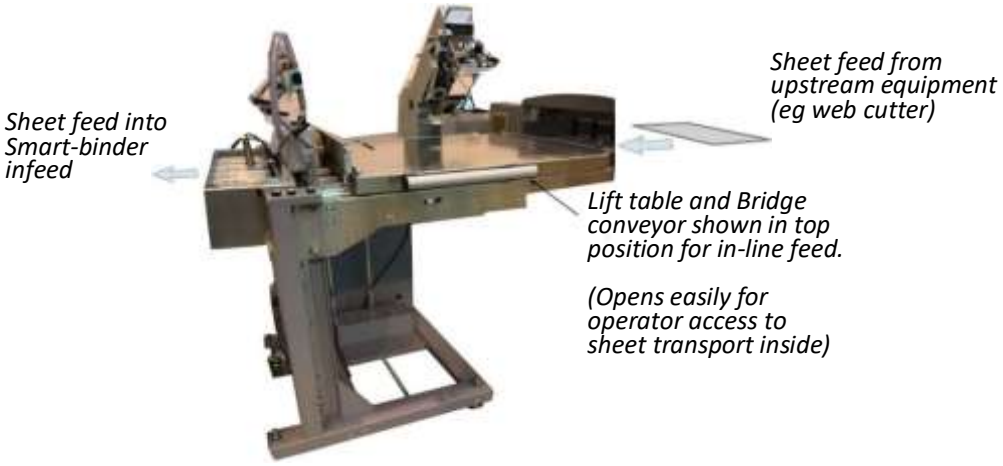


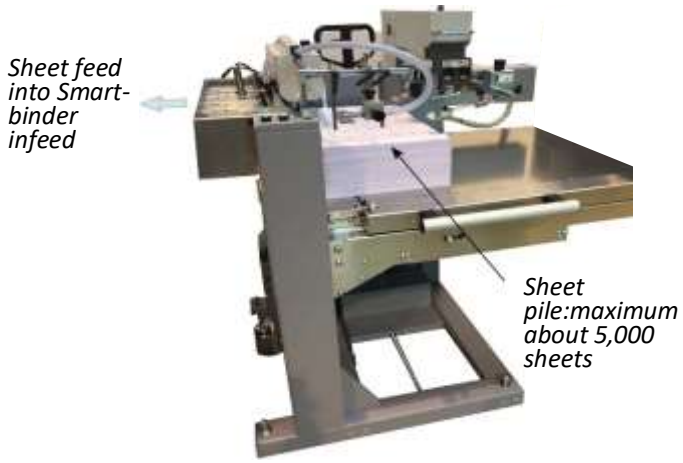
In-line operating mode

To run in-line, the 'Lift Table and Bridge conveyor' is raised to its highest position, as shown below. The bridge conveyor, which is integral with the lift table, then transports sheets from the upstream web-cutter through the sheet feeder to the Smart-binder infeed.



Off-line sheet feed mode

When running 'off-line' the 'lift table and bridge conveyor' is lowered and bar-coded sheets are loaded onto the bridge conveyor, as shown below. The feeder then feeds sheets one by one off the top of the pile into the Smart-binder at rates up to 400 sheets/min.



Notes

The changeover between in-line and off-line operation is less than one minute. The feeder must be stopped for about two minutes to reload the pile.

Each printed sheet must have a bar code, or Datamatrix code, printed on it to allow the Smart-binder to control booklet integrity.

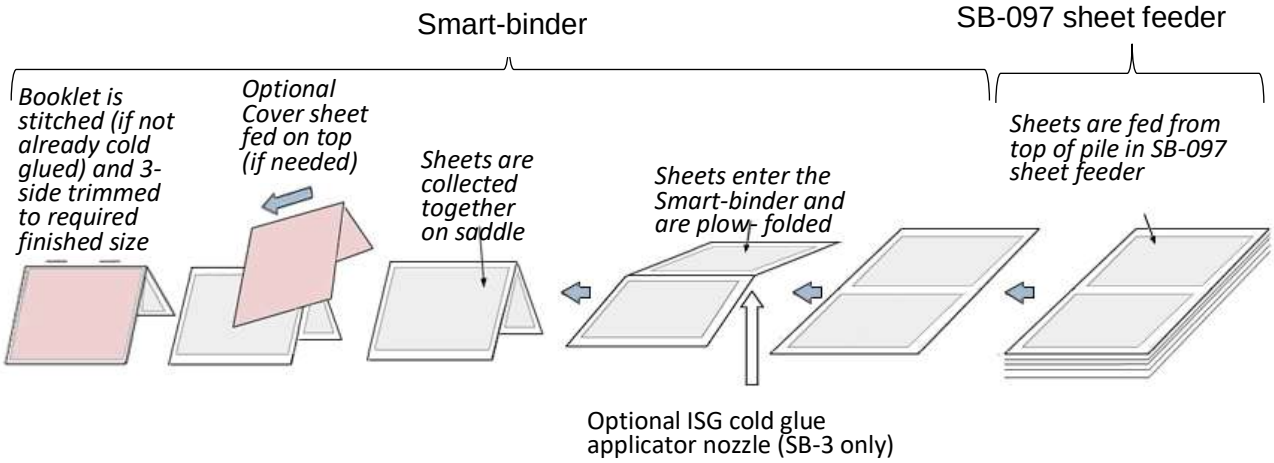
The length of the SB-097 feeder is 1230mm (48 7/16").

The feeder requires a 10A 3-phase power supply

The height of the bridge conveyor can be varied between 925mm (36 7/16") and 1100mm (43 5/16"), by raising or lowering the complete feeder.

The SB-097 has a maximum sheet width specification of 500mm (19 9/16")

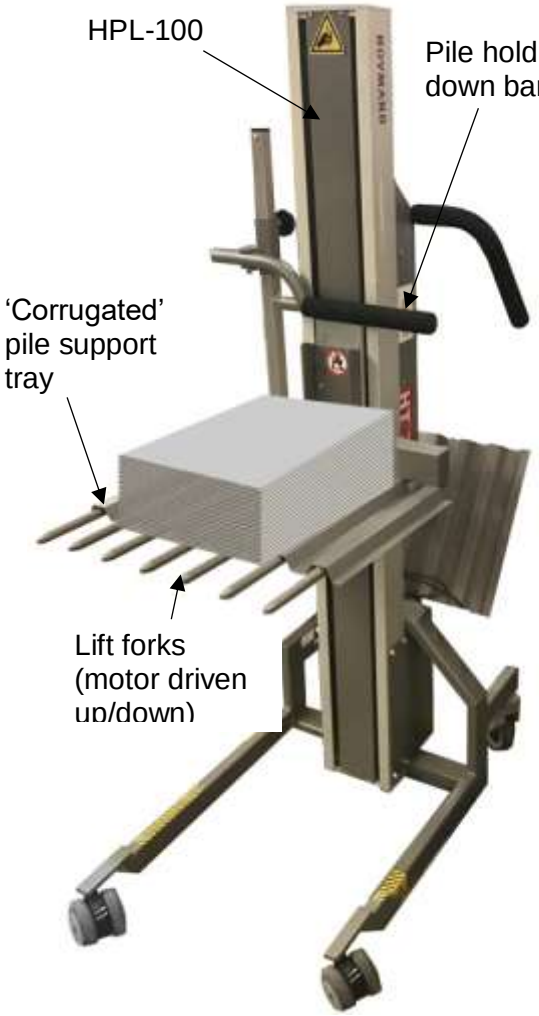
Sheet Flow Diagram for off-line operation



View a short video of the SB-097 feeder HERE.

Appendix 8:
Sheet pile handling system HPL-100

The Hovmand pile handler HPL-100 is a lifting trolley system which can pick up a large sheet pile (up to 380mm pile height), move it to the IBIS Smart-binder and place the pile on the lift table of the sheet feeder SB-095, SB-096 or SB-097. This reduces the Smart-binder stop-time by reducing the pile reload time.



The HPL-100 is mounted on wheels so it can be easily moved around the factory. An integral battery-powered electric motor is used to raise and lower the forks.

A separate 'pile-support tray' allows the forks to be lowered and withdrawn when the pile is placed on the feeder lift table.

Sequence of operation:

1. Sheets are built up into a pile (up to 380mm height) on the 'pile support tray'. *Note: an optional stacking table ST-100 may be supplied to assist creation of this pile.*
2. The HPL-100 forks engage with the support tray and lift the pile. The 'hold -own' bar may be used to prevent the pile being disturbed while being moved
3. The pile is transported to the Smart-binder sheet feeder and placed on the feeder lift table. The HPL-100 is then removed and the pile is slid into the feed position
4. When all the sheets have been fed into the Smart-binder the support tray is removed and the HPL-100 loads the next pile

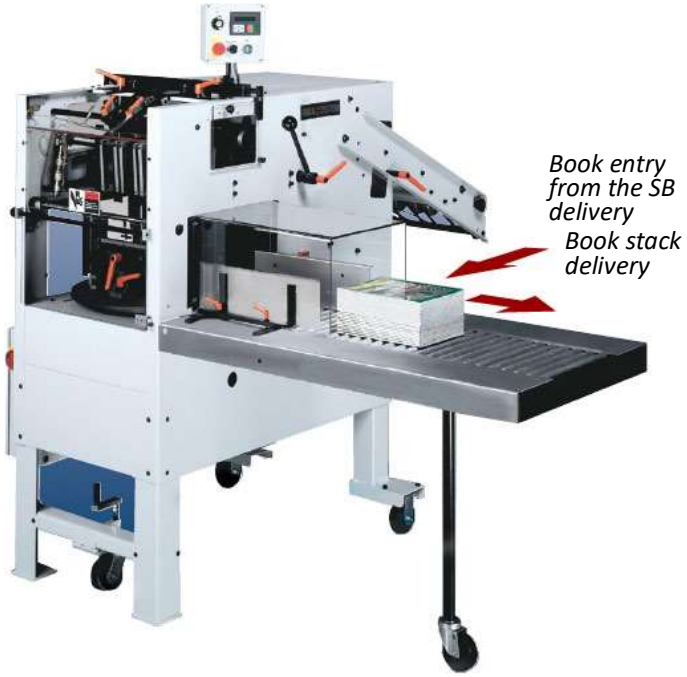
   Note: multiple support trays may be provided

View a video of the Hovmand Pile Handler loading a sheet pile into the feeder HERE.

Appendix 9:
Optional automatic book stacker BSS-10 or BSS-11

The BSS-10 or BSS-11 booklet stacker is used in-line with the Smart-binder delivery conveyor to automatically stack books allowing non-stop Smart-binder operation without the need for the operator to continually remove books from the delivery conveyor. Books pass through the standard delivery conveyor into the BSS-11 stacker where they collect into horizontal piles up to 330mm (13” high). The number of books in each pile is selectable by the machine operator. A turntable in the stacker enables books within each pile to be stacked in batches with spines in each batch in the opposite direction to the spines in the next batch. This ensures pile stability by avoiding all the spines being on the same side.

Book piles are delivered onto a free running roller table where they accumulate until removed by the operator. In-line (or off-line) pile ‘banding is also available.

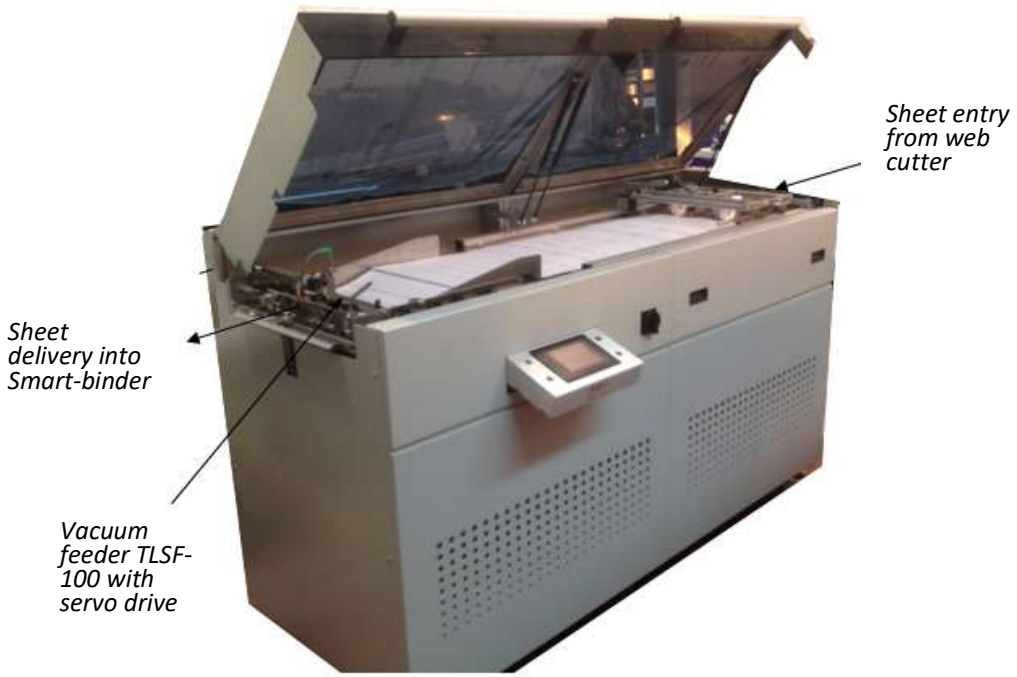


The BSS-11 book stacker: for in-line connection to the Smart-binder delivery conveyor

The BSS-10 stacker includes the option to add a code reader and intelligent stacking controls to manage automatically the booklets or signatures in each stack

Appendix 10:
Optional sheet buffer module SBS-100

The SBS-100 buffer module may be used in between the web cutter and the Smart-binderto remove the 'hard coupling' between the web-cutter and the in-line Smart-binder.



SBS-100 sheet buffer

Benefits of using the SBS-100:

1/ The SBS-100 enables a small proportion of **very thin booklets** (mixed with thicker booklets) to be produced at reduced Smart-binder speed, while the web-cutter can continue running at normal running speed without have to slow down (as it would have to without the SBS-100 buffer installed). A festoon web buffer can also perform a similar function, but the SBS-100 can store a lot more paper than a web buffer and can be controlled directly from the Smart-binder so as to feed sheets exactly at the rate determined by how many sheets are in each required booklet.

2/ The SBS-100 enables the Smart-binder to stop for a short time (1- 2 minutes depending on printer speed) without stopping the printer, which reduces down time and improves system operating efficiency.

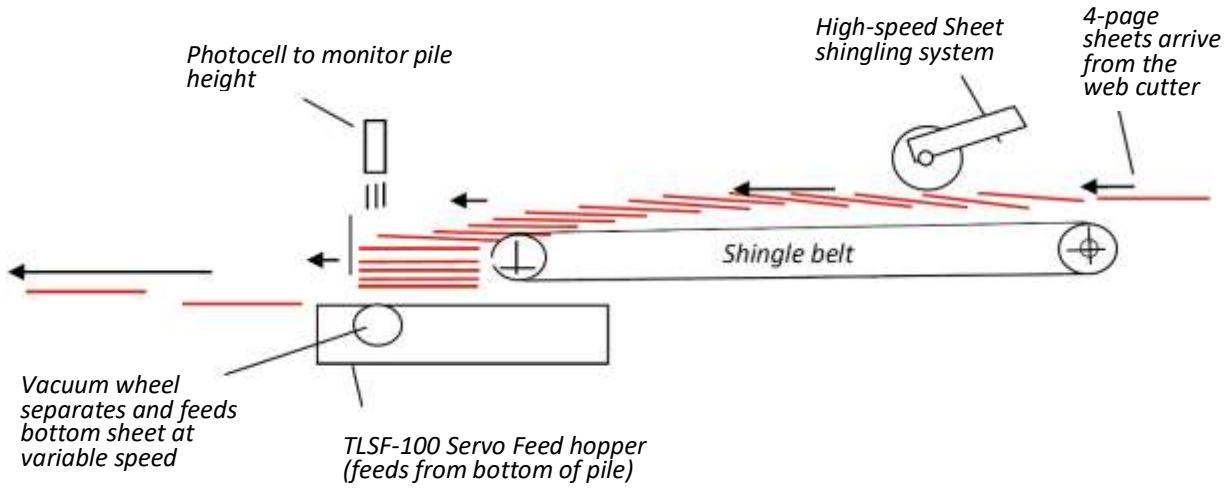
3/ The SBS-100 may also be used to produce very thin booklets which are continually varying in number of pages, by allowing the Smart-binder to run a fixed cycling rate (continuous operating mode).

The SBS-100 operates as follows:

1/ Sheets from the web cutter are collected in an overlapping ‘shingled stream’ on the shingle conveyor. The shingled sheets flow into the ‘top loaded’ sheet feeder TLSF-100. The TLSF-100 feeds sheets out from the bottom of the pile at a rate determined by the number of sheets in the booklet being made by the Smart-binder.

2/ If the bar code reader detects that some very ‘thin’ booklets (containing a small number of pages) must be produced, then the sheet rate from the TLSF-100 is automatically reduced to avoid exceeding the Smart-binder maximum output cycle rate. In this case the sheet pile height increases in the TLSF-100 feed hopper. After these ‘thin’ booklets have been produced then the sheet feed from the TLSF-100 increases and the pile height in the hopper reduces to the normal running height.

View SBS-100 video.



Note: The SBS-100 requires a power supply of 200-240V, 50/60Hz, 1P+N, 5A, and a compressed air supply of 10CFM (17m3/hr.) at 90psi (6.2 bar).

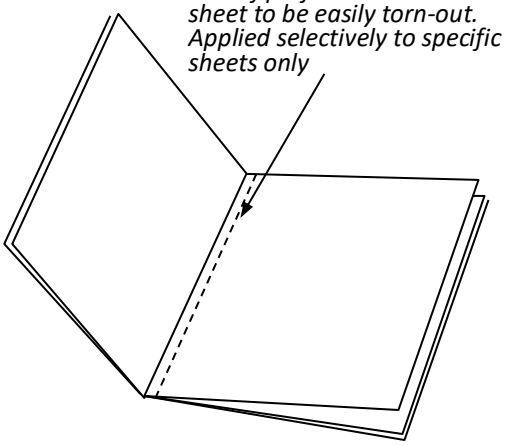
Appendix 11:
Optional dynamic micro perforator DMP-100

The optional DMP-100 dynamic perforator will perforate a sheet at any place based upon a barcode input. All perforations run parallel to the folded sheet edge (booklet spine). The perforation module comes standard with TWO perforation wheels. Each wheel is activated by a single extra digit in the standard IBIS sheet barcode, so that each side of the sheet can be perforated (or not) on command. A variety of different perforation wheels are available ranging from micro-perf, up to a very coarse perf. The DMP-100 makes it easy to incorporate selective “pull-out” sheets into the finished booklet.

IBIS DMP-100 Dynamic Perforation Unit mounted between the conveyor and the scoring module on an off-line Smart-binder.

DMP-100 Rotary perforator knife actuators

Line of perforations to allow sheet to be easily torn-out. Applied selectively to specific sheets only



The DMP-100 module adds 320mm to the length of the Smart-binder system and requires an external high-pressure air supply.

Appendix 12:
Optional 100 kg wire spools/holders HKS-100 & trolley WST-100

To reduce the frequency of replacing wire spools, and to reduce wire 'pulling' force, it is recommended that 100 KG floor mounted wire spools are used instead of the standard 2.5 Kg machine-mounted spools:

Wire spool holder with brush to resist wire unwinding.

100Kg wire spool (mounted on floor behind Smart-binder).

The optional Wire Spool handling trolley is also offered for use with 100Kg wire spoolsto move the spools into position next to the Smart-binder stitcher.

Hydraulic lifting 'jack'

WST-100 loading trolley

100Kg wire spool

Trolley Wheels

The trolley includes a hydraulic jack to lift the spools.

Wheels allow easy movement around the factory floor.

Appendix 13:
Optional folder F-100

The optional F-100 pre-folds sheets before they enter the Smart-binder infeed. The folder may be used either to produce small format books, increase SB page throughput, or reduce input sheet rate.

When using the F-100, then sheets are printed with 4 pages on each side (instead of the normal 2 pages on each side when not pre-folding). These 8-page sheets are then folded by the F-100 across the middle ('buckle'-folded) before they enter the SB and are folded again in the opposite direction by the SB plow-folder.

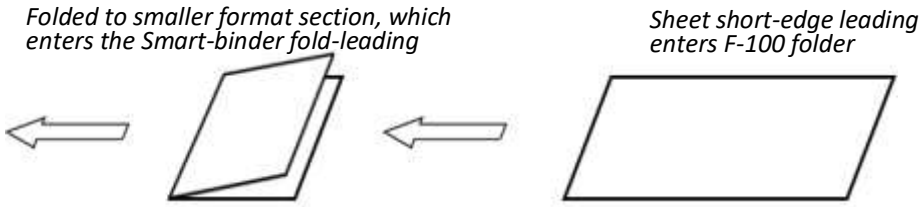
F-100 cross-folder unit used directly before SB infeed

For example: to produce **A5 (Digest – 5.5" x 8.5") books**, print oversize A3 sheets (or oversize 11 x 17"). These sheets must enter the F100 short-edge leading. The folder then folds the sheet in half to give an oversize A4 (or oversize 8.5" x 11") section with the folded edge leading. These folded sections then enter the Smart-binder, and are processed normally thereafter into finished A5 books.

To produce **A4 (or Letter - 8 ½ x 11") books**, print oversize A2 sheets (or oversize 17 x 22"). These sheets must enter the F100 short-edge leading. The folder then folds the sheet in half to give an oversize A3 (or oversize 11 x 17") section with the folded-edge leading. These folded sections then enter the Smart-binder, and are processed normally thereafter into finished A4 or 'letter' size books.

Since sheets are folded into sections before entering the Smart-binder, and books can only be made from whole sections, it is only possible to make books with pages in multiples of 8-pages when using the F100 folder.

Folded sections are more bulky than flat sheets, so this technique may also reduce the maximum number of pages in the book.



Sheet flow through the F-100 Folder

The folding process may be deactivated when it is required to pass 4-page sheets through the F-100 without folding.

The F-100 folder may be fitted with optional anti-static bars to reduce the static charge on the sheets delivered to the Smart-binder.

When using ISG gluing together with pre-folded sheets, then a second cold-gluing nozzle must also be installed in the folder (to place a line of glue inside the folded sheet). See option FGS-100.

The F-100 enables the maximum web speed to be increased to about 180 meters/min or, if running from a sheet feeder the maximum page throughput can be increased.

The F-100 also allows the minimum paper weight to be reduced to approximately 40 gsm (at reduced web speeds).

Appendix 14:
Optional rotator/folder RF-100

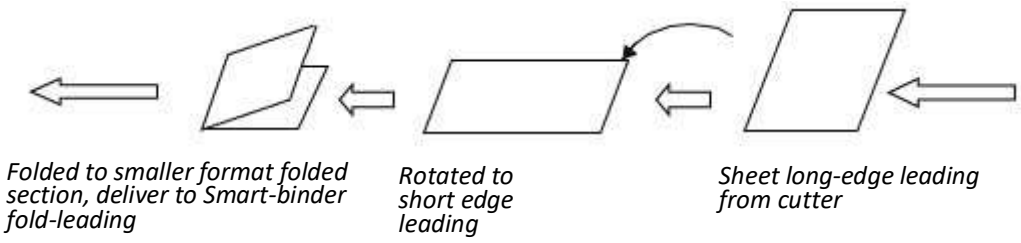
The optional RF100 “rotator folder” may be used with the Smart-binder to produce small format booklets from normal width (440-460mm) web, in-line with a web printer. This allows the normal ‘wide’ web to be used when making small format booklets, instead of having to change to a ‘narrow’ paper web.

RF-100 rotator/folder unit positioned before the SB infeed

For example: to produce A5 booklets, print oversize A3 sheets with 8 pages on each sheet. These sheets will be delivered long-edge leading. The rotator folder then rotates each sheet by90-degrees to short-edge leading. Each sheet is then folded in half to give an oversize A4 section with the folded edge leading. The folded sections are then fed into the Smart-binder, and processed normally.

Since sheets are folded into sections before entering the Smart-binder, and books can only be made from whole sections (8-pages per section), it is only possible to make books with pages in multiples of 8-pages, instead of the normal 4-page increments.

Folded sections are more bulky than flat sheets, so this technique may also reduce the maximum number of pages in the book.



Sheet flow through the RF-100 “Rotator/folder”

Both the rotating and folding processes may be deactivated when it is required to pass sheets through the RF-100 without rotating or folding.

The RF-100 folder may be fitted with optional anti-static bars to reduce the static charge on the sheets delivered to the Smart-binder.

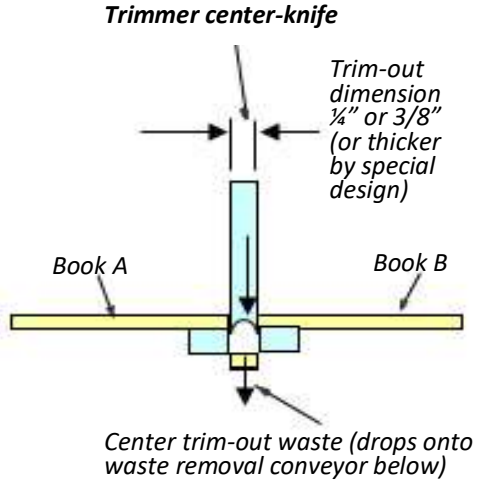
When using ISG gluing together with pre-folded sheets, then a second cold-gluing nozzle must also be installed in the folder (to place a line of glue inside the folded sheet). See option FGS-100.

It is not recommended to use the RF-100 for sheet rotation if the sheet weight is less than 60 gsm, or if sheet input rate is higher than approximately 300 sheets/min. The RF-100 may be used at higher speeds when not rotating. For example, the RF-100 may be used without rotation to buckle fold each sheet and thereby increase the maximum web speed to approximately 180 meters/min

Appendix 15:
Optional CKN center knife assembly

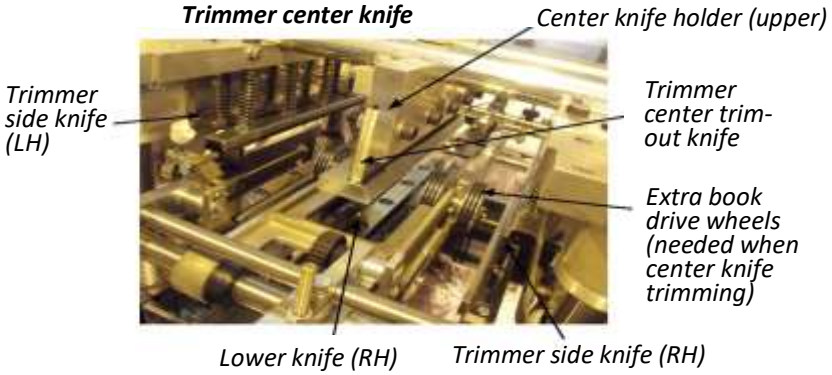
CKN-100, CKN-101 or CKN-102 Trimmer center-knife

The optional Smart-binder trimmer center-knife system may be used to produce book sizes which are less than 160mm (6 1/4”) spine length (e.g.: A5 landscape or 8 ½ x 5 ½” oblong). Each sheet is printed with 8 pages instead of the normal 4 pages. These sheets are individually folded and then either stitched or glued together in the normal way. The center-knife then splits the resulting book into two smaller sized books, which are delivered in two parallel streams.



Center-knives are available in widths of 6.35mm (¼”) (CKN-100) and 9.52mm (3/8”) (CKN-101). These trim 6.35mm (¼”) or 9.52mm (3/8”) out of the middle of the book. Book thickness is limited to3mm (1/8”) (⅛") for the 6.35mm (1/4”) knife and 4.5mm (3/16”) for the 9.525mm (3/8”) knife

Option CKN-102 can separate the two books without any trim out. Thicker books may be produced if using the CKN-102 single knife center-split instead of a double-edged trim-out knife.



Appendix 16:
Optional cover matching system BCR-105

Some production jobs require a separately fed cover which contains **personalized data** (such as an individual name and address) which must **'match' the data printed on the inside sheets**.

The optional BCR-105 cover matching system, uses a **code reader fitted in the Smart-binder cover feeder**. As each cover is fed from the bottom of the pile the code reader reads a numerical MS-3 (1D) bar code printed on the outside of the cover. This numerical code contains an ID number which is unique to that particular cover.

The inside sheets arriving from the web cutter (or sheet pile feeder) are also coded. These sheet codes also contain an ID number which is unique for each booklet. A separate reader mounted on the Smart-binder infeed (or in the sheet pile feeder) reads these inside sheet ID numbers.

If cover and inside sheet IDs match the cover is folded and placed on top of the collated set of inside sheets to form a complete and correct booklet with 'matching' cover.

If the cover and inside sheet IDs differ the Smart-binder stops and the control screen indicates a cover 'mismatch'. The operator must regain correct cover sequencing before the machine is restarted.

The cover matching system may be added to all existing or new Smart-binders that have a cover feeder fitted.

As an alternative to the BCR-105 cover matching system, covers may contain a ‘cut-out window’ which allows personalized details printed on the first page of the inside sheets to be visible from the outside of the book.

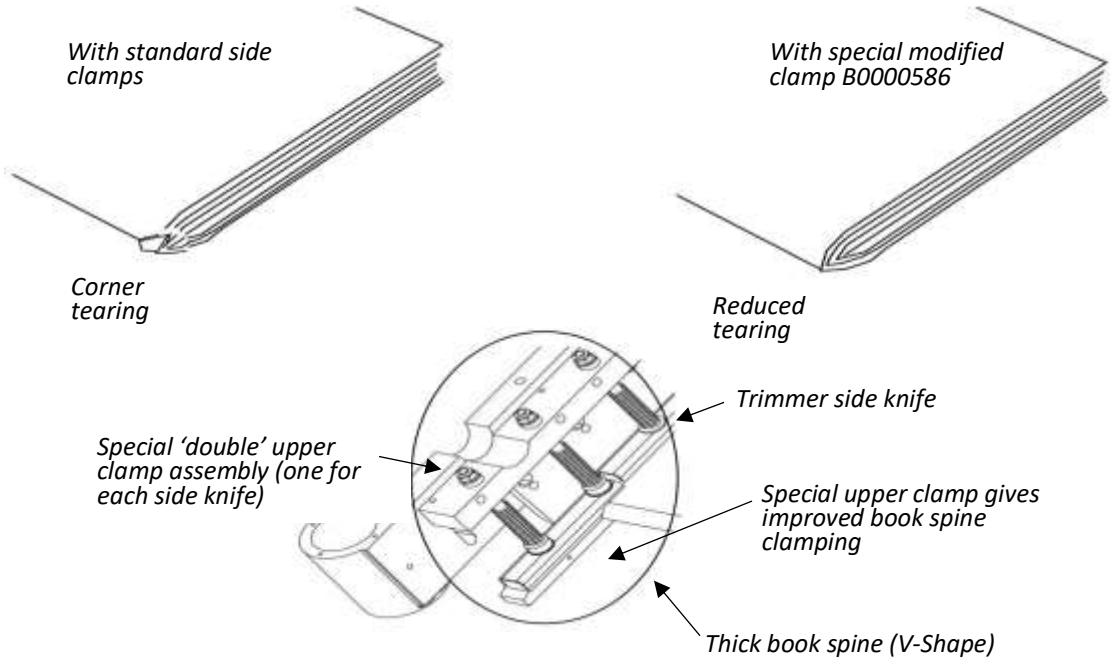
A special extra guide is available to allow the covers with cut-out windows to feed reliably from the cover feeder.

Appendix 17:
Optional spine clamp kit TCA-100

The Spine Clamp Kit TCA-100 reduces book corner tearing when making very thick booklets.

All saddle-stitcher side-knives normally result in some tearing of the corner of the book spine. This results from the fact that the V shaped spine is not supported well by upper clamps.

The clamp kit modification ensures that the V spine is better clamped to reduce spine corner tearing by the side knives. The standard modification kit is designed to suit A4 or USA 8 ½ x 11" finished book sizes only. For other sizes refer to IBIS.

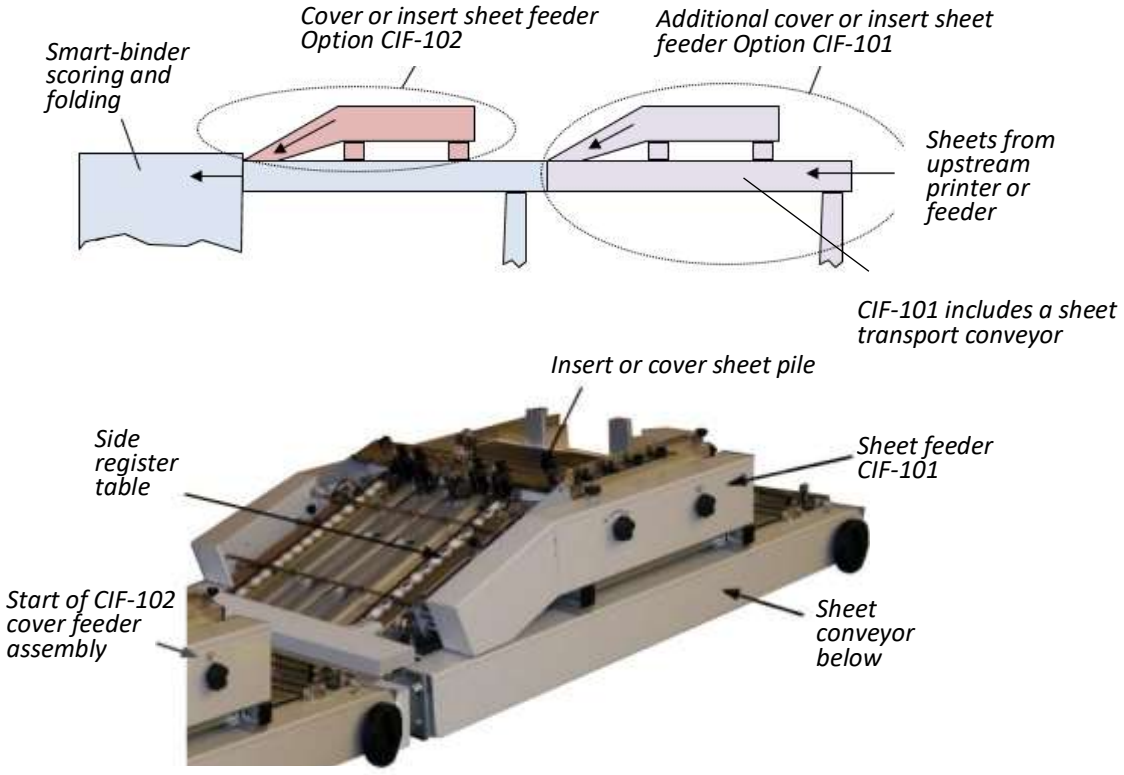


Appendix 18:
Optional Additional Cover or Insert Sheet Feeder CIF-101

The **CIF-101 Sheet Feeder** is designed to feed an extra cover or insert sheet as part of a booklet assembled by the IBIS Smart-binder.

The CIF-101 is mounted on **slide rails** on top of a sheet transport conveyor (the assembly includes both items supplied as one unit)

The CIF-101 is used in conjunction with the standard **Smart-binder cover feeder CIF-102.** Both are identical feeders, but the assembly CIF-101 includes a second sheet transport conveyor below. Note: CIF-102 cover feeder option does not include a sheet conveyor because this is part of the standard Smart-binder.



The CIF-101 feeds sheets from the bottom of the pile using a rotating vacuum wheel. Air-blow nozzles mounted at the sides and rear of the feeder help separate covers from each other in the pile. Inserts may be **reloaded on-the-run** without stopping the Smart-binder.

The insert or cover sheet is **independently side-registered** so that the width does not have to be the same as the 'content' sheets. However the insert/cover sheets must be the same length as the sheets on to which they are fed (same spine length). Insert sheets that are longer or shorter than the other sheets in the book will cause some loss of print registration between sheets.

After side register, then the insert/cover sheets join the stream of other 'content' sheets, pass below the CIF-102 cover feeder and enter the Smart-binder scoring and folding module. **Scoring pressure** may be adjusted to minimize color-toner cracking. However, the optimum way to eliminate cracking of color toner is to pre-crease the inserts.

The CIF-101 insert sheet feeder is controlled by a **coded digit** on the content sheets coming from upstream. This allows the CIF-101 to automatically feed the insert or cover at the correct position required inside or outside the book.

A **code reader** is available for the CIF-101 feeder if feeding **personalized inserts or covers**. The CIF-101 feeder will then compare the unique ID number in the insert/cover sheet code to the ID number in the barcode on the incoming text content sheets. The Smart-binder can be programmed to either stop on a mismatch, or reject the booklet (without stopping) via the trimmer reject gate.

The insert feeder CIF-101 is capable of feeding sheets in the range **90 – 230 gsm** (61 – 154lblbs. offset or 24 -61lblbs. bond). Sheet weights outside this weight range should be tested before use to check feeding performance.

If feeding sheets from the CIF-101 insert feeder and making **ISG cold-glued books**, or if feeding an insert sheet into the center of a book **(**center **spread)**, then there must be sufficient space between sheets coming from upstream into which to feed the insert sheet. If running in-line with a high-speed digitally-printed web, then this may mean that the web cutter must be programmed to pause momentarily,to create this gap. If feeding from a pile feeder, then the gap in sheet feeding can be created automatically by the Smart-binder feeder control system.

Refer to IBIS if needed to feed more than one insert or more than one extra cover in each book.

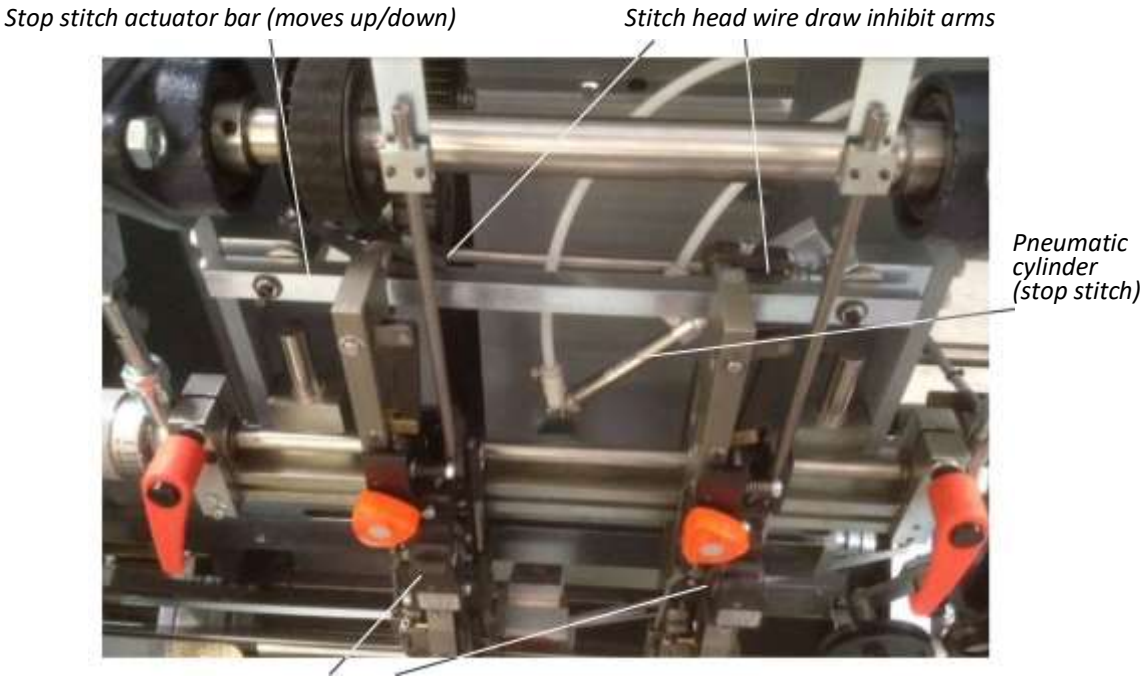
Inserts or covers with **tear-off perforations** may be run depending on the type and position of the perforations. Check with IBIS first if wishing to run perforated covers. Note that an optional 'dynamic' micro-perforation system (option DMP-100) is available for installation just before the Smart-binder folder. This may be used to automatically perforate insert sheets (and any other sheets) if not already pre-perforated.

Feeding a center-insert: the standard cover feeder CIF-102 may be used to feed an insert sheet inside the booklet in any position except in the center of the booklet. The CIF-101 insert feeder must be used if the insert is required in the center of the booklet.

The optional additional **CAL-101 cover autoloader** is recommended for use with the CIF-101 cover feederto increase the pile height from 20 to 200mm and to improve cover feed reliability.

Appendix 19:
Optional automatic 'stop stitch' SDI-100

The optional stitcher wire draw inhibit system allows the stitching operation to be automatically inhibited on demand. It may be activated automatically under bar code control or manually from a switch on the outside of the machine. The system uses a pneumatic cylinder which rotates the wire draw inhibit arms on each stitch head.



Stitch heads, modified for auto wire inhibit actuation

The benefits of the optional auto stop-stitch system are:

1/ It allows wire stitching to be automatically inhibited when not needed (i.e. when making a 4-page booklet, or an ISG cold glue bound booklet).

2/ It allows the stitching process to be automatically stopped when running books out of the machine at the end of a job. This prevents having to open the machine guard to manually deactivate the wire drive on each stitch head.

Appendix 20:
Optional spine squaring module SM-101

The SM-101 in-line book spine-squaring module may be connected to the end of the Smart-binder delivery conveyor. Each book exiting the Smart-binder is transported into the SM-101 where it is stopped, clamped and the spine is compressed into a 'square' shape.

The book is then ejected onto a horizontal stack on top of the module

The maximum book thickness for spine squaring is 6.5mm. The maximum SM-101 throughput rate is 28 books/min, which reduces the Smart-binder booklet output rate when making thinner booklets.

Saddle-stitched book <u>before</u> spine squaring

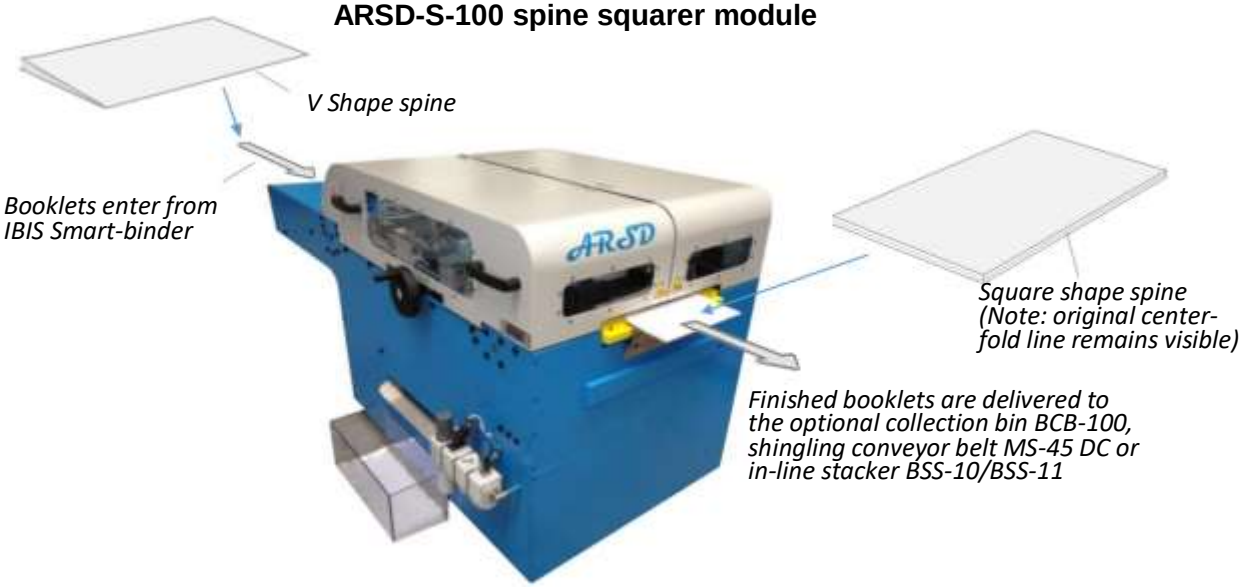
Saddle-stitched book <u>after</u> spine squaring

Note: See the alternative ARSD-S-100 module if a higher performance and heavier-duty spine squaring system is needed

Appendix 21: Optional spine squarer ARSD-S-100

The **ARSD-100 spine squarer module** may be integrated into the Smart-binder deliveryto press the booklet spine into a square shape using high pressure clamps

ARSD-S-100 spine squarer module

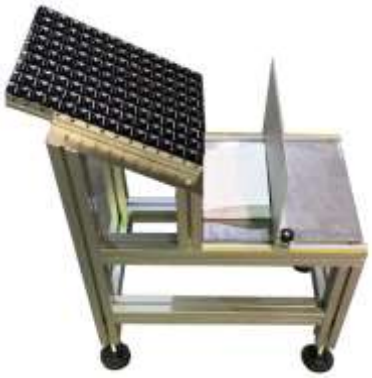


View a video of the ARSD-S-100 in operation

The finished 'squared' booklets are then delivered into a simple collection bin BCB-100 or onto an optional 1.2m long horizontal delivery conveyor MS-45 DC, or directly into the booklet stacker BSS-10 or BSS-11.

The ARSD-S-100 may be supplied with manual or automatic adjustment for changes in booklet thickness.

Note: the ARSD-S-100 is twice as fast, much more robust and can handle a booklet of double the thickness, compared with the lower-cost spine squarer option SM-101.



Booklet collection bin

Technical specification:

Maximum speed	See 'Running speeds' table on next page
Minimum booklet thickness	3 mm (1/8")
Maximum booklet thickness	10 mm (3/8")
Minimum size	210 mm spine length – 150 mm width
Maximum size	420 mm spine length – 330 mm width
High pressure air supply required	7 Bar
Electrical power required	2 KW

ARSD-S running speeds

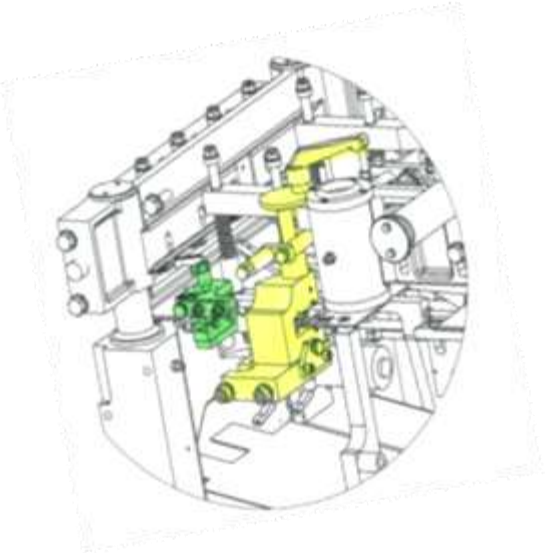
Booklet Thickness	**Number of spine pressure cycles**	**Max Speed (cycles/hr) without automatic thickness adjustment**	**Max Speed (cycles/hr) with automatic thickness adjustment**
From 1 to 3 mm	0	5,000 (no squaring)	5,000 (no squaring)
From 3 to 4 mm	1	3,200	2,307
From 5 to 7 mm	2	1,978	1,651
From 8 to 10 mm	4	918	845

Appendix 22 Optional corner hole punch module CHP-100

The single hole-punch system CHP-100 may be installed in the Smart-binder trimmer to punch a hole in the right corner of each booklet (looking in direction of book flow).

It is installed in a location such that the hole is punched at the same time as the book front edge is trimmed. The punch is driven by the downward motion of the upper trimmer knives and this drive may be easily inhibited by a quick manual adjustment of the drive arm. The punch is spring driven back up out of the book as the knives move back up to their top position.

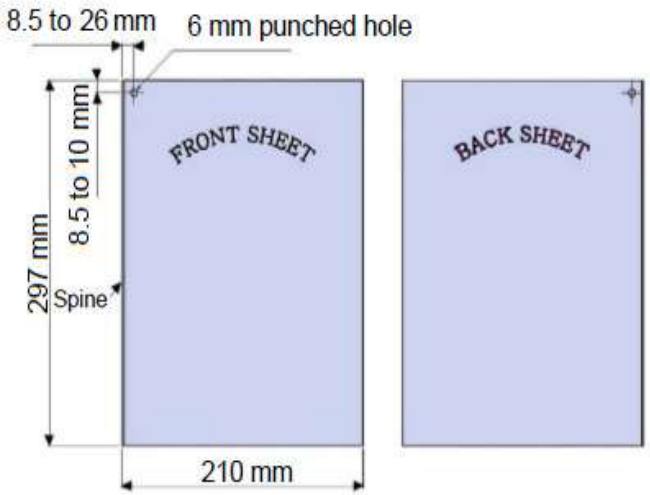
The system includes a set of new additional pneumatic-driven side joggers, which ensure that each book is correctly side-registered before the hole is punched.

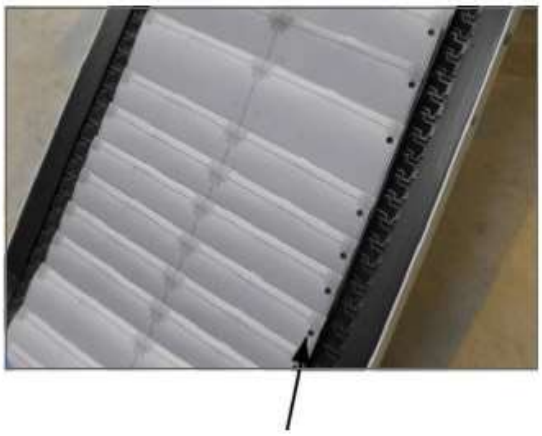


Hole punch installed in trimmer

CHP-100 Specifications

- Hole diameter : 6mm
- Finished trimmed booklet size = 297 spine length x 210 width (A4)
- Book thickness: 0 –3mm (1/8")
- Hole position measured from side-edge of book: 8.5-10mm *(this side will be the 'head' of the book assuming the book travels through the trimmer with front cover side facing upwards)*
- Hole position measured from spine-edge of book : 8.5 – 26mm
- Speed: defined by Smart-binder trimming speed (does not introduce slow-down)





Booklets with punched holes on trimmer delivery conveyor

Appendix 23:
Optional Smart-Data Analysis System SDA-100

The Smart-Data Analysis System SDA-100 ddisplays detailed Smart-binder performance data in an easy-to-use format. It can be added to any IBIS Smart-binder and collects data from multiple Smart-binders and displays at one point. The system can also export data to enable users to create their own Excel reports.

Different production data reports available:

- **Production output:** shows sheets processed and booklets produced during each hour (see example below)
- **Jobs:** lists jobs run and booklets produced during each job
- **Daily run times:** shows when the machine was running
- **Errors:** shows which faults occurred
- **Job Summary:** shows duration and output for each job
- **Reprint report:** shows the IDs of rejected booklets

1/ Example of SDA 'Production Output' Report:

OUTPUT	JOBS	RUN TIMES	ERRORS	REPORTS	FILES

Date	Hour	Running minutes	Booklets delivered	Booklets rejected	Sheets delivered	Sheets rejected	Efficiency %
7/10/2019	12:00	57	5698	2	17094	24	99.9
7/10/2019	13:00	55	5481	18	16443	54	99.7
7/10/2019	14:00	58	5789	8	17367	24	99.9
7/10/2019	15:00	47	4693	6	14079	18	99.9
7/10/2019	16:00	56	5593	5	16779	15	99.9
7/10/2019	17:00	53	5296	0	15888	0	100
8/10/2019	09:00	31	1222	1	7332	6	99.9
8/10/2019	10:00	56	2363	3	14178	18	99.9
8/10/2019	11:00	49	2058	0	12348	0	100
8/10/2019	12:00	58	2445	0	14670	0	100
8/10/2019	13:00	57	2401	0	7203	0	100

2/ Example of SDA 'JOB' Report:

OUTPUT	**JOBS**	RUN TIMES	ERRORS	REPORTS	FILES

Job Number	Start time	Stop time	Booklets delivered	Booklets rejected	Sheets delivered	Sheets rejected	Efficiency %
0313581322	10/02/20: 12:10hrs	11/02/20 18:10hrs	28342	5	113348	20	99.9%
0213581322	11/02/20 18:10hrs	11/02/20 18:17hrs	466	1	1395	3	99.8%
0313581322	11/02/20 18:17hrs	11/02/20 18:55hrs	2531	4	10108	16	99.9%
2013581322	11/02/20 18:55hrs	12/02/20 13:05hrs	3632	7	72633	140	99.8%

3/ Example of SDA 'Run Times' Report:

OUTPUT	JOBS	**RUN TIMES**	ERRORS	REPORTS	FILES

Date	12:00	13:00	14:00	15:00	16:00	17:00	18:00
11/02/2020	10	53	55	45	53	54	25
12/02/2020	17	3	52	49	0	0	0
13/02/2020	0	0	0	0	0	0	0
14/02/2020	21	45	55	55	53	47	0
15/02/2020	0	0	0	0	0	0	0
16/02/2020	16	54	58	53	55	57	12
17/02/2020	55	52	53	54	56	10	0
18/02/2020	0	0	53	55	0	0	0
19/02/2020	10	54	55	57	52	50	12
20/02/2020	13	52	55	56	57	50	22
21/02/2020	0	0	0	0	0	0	0

4/ Example of SDA 'Errors' Report:

OUTPUT	JOBS	RUN TIMES	**ERRORS**	REPORTS	FILES

Date/Time	57 Too many misfeeds	62 Sheet Jam: Collator	74 Book Jam: Pusher	80 Book Jam: Transfer	82 Book Jam: Trimmer Upper Nip	86 Book Jam: delivery
13/02/20 11:00	0	1	0	0	0	0
13/02/20 12.00	1	0	2	0	0	0
13/02/20 13:00	0	1	0	1	0	0
13/02/20 14:00	0	0	0	0	1	0
13/02/20 15:00	0	0	0	0	0	0
13/02/20 16:00	1	0	0	0	0	0

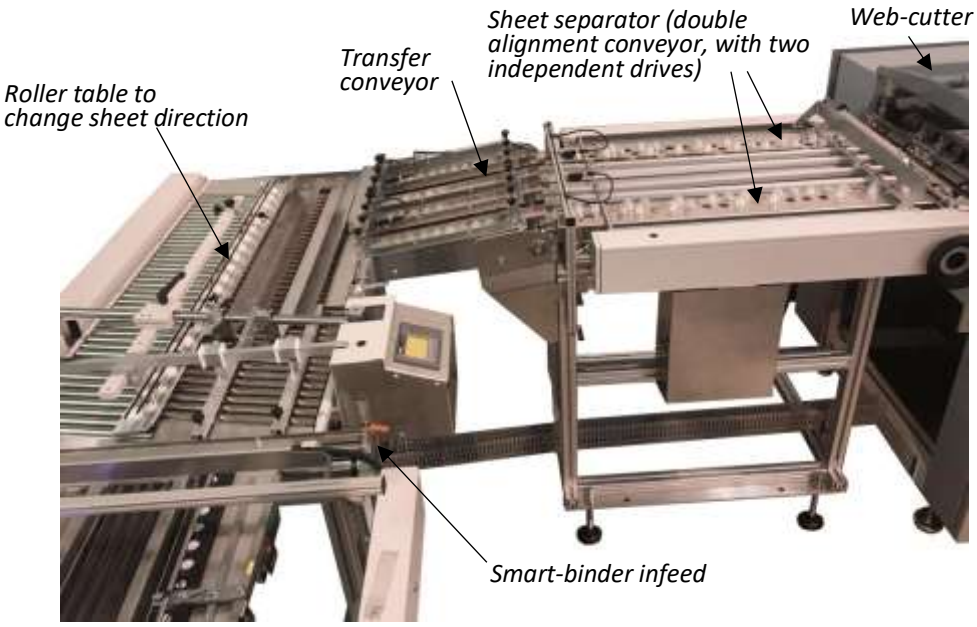
Note: the above example shows only 6 code errors. Additional code errors are available to view. The error report shows if there are any areas of the Smart-binder that are frequently causing machine stops and where remedial actions therefore need to be taken to reduce these types of stops.

Appendix 24:
Optional 2-up sheet direction change system TUSDC-100

The TUSDC-100 modules may be installed in between a web cutter and the IBIS Smart-binder to enable A5 (or 5½ x 8½") booklets to be produced from a 450mm, (or 17½ - 18") wide web using 4-page sheets. This is an alternative to the RF-100 solution which uses 8-page sheets.

The web is cut into sheets using both a cross-cut and a longitudinal center-slit. Two sheets approximately size 225 x 320mm (or approximately 9 x 12") are delivered side-by-side from the web cutter. The sheets are then separated by the double alignment conveyor to introduce a gap of about 20-30 mm between sheets.

The velocity of each sheet is adjusted to ensure the front edges of the pair of sheets are aligned. A separate transfer module then delivers the pair of sheets onto a roller table which changes their direction by90-degrees so that they can enter the Smart-binder one behind the other.



The maximum web speed to ensure reliable direction change is approximately 60 meters/min (197 ft/min), which results in approximately 375 four-page sheets/min (1,500 pages/min). Paper stock weight must be at least 70 gsm for reliable direction change.

View an IBIS web-site video of the TUSDC-00 system with the Smart-binder producing 5 ½ x 8 ½" booklets from an 18" web TUSDC-100 system

Appendix 25: Optional sheet pile feeder SB-096

If feeding the Smart-binder from an SB-095 (or SB-097) sheet pile feeder, then an additional **side-fed SB-096 sheet pile feeder** is available The SB-096 includes a roller table that changes sheet direction by90-degrees:

The SB-096 feeder may be loaded with piles of pre-collated sheets and **optional loading trolley options** PLT-100 and HPL-100 are available to assist loading The maximum pile height is approximately 550mm (21.65") but actual pile heights depends on a number of factors including the amount of toner used (the top sheet must remain relatively flat).

The SB-096 feeder must be stopped to reload the pile. Allow about 5 mins to reload without using the optional loading trolley, or approximately ½ min if using the loading trolley PLT-100. Each sheet requires a code printed on the edge.

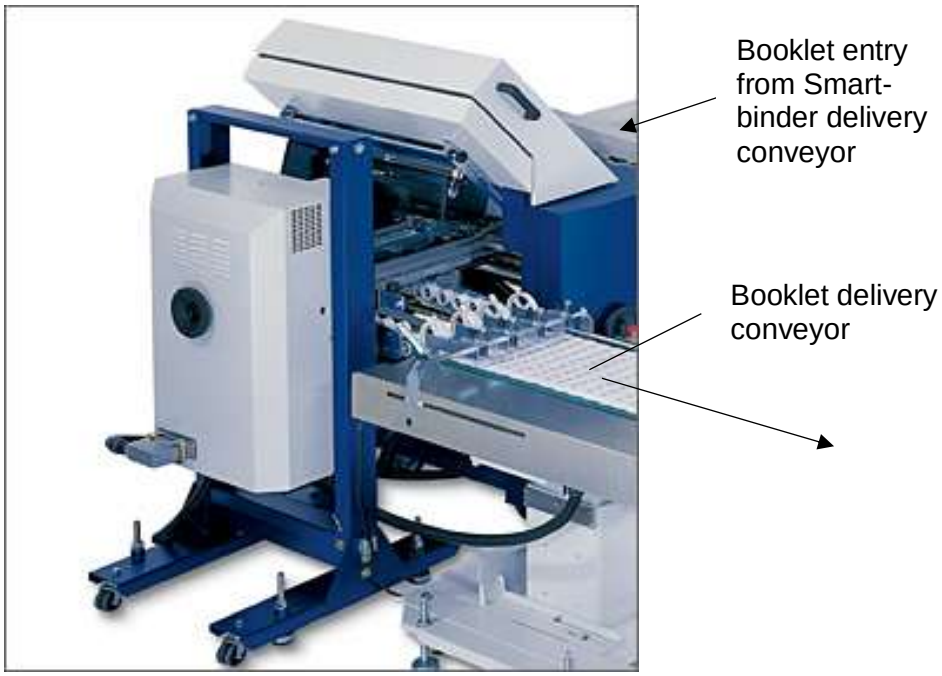
When feeding sheets from the SB-096 then the feed rate is limited by the rate at which the sheets can change direction on the roller table.

Gaps will be created automatically in the stream of sheets fed from SB-095 to accommodate sheets fed from SB-096 and to give time for the SB-096 sheets to change direction on the roller table.

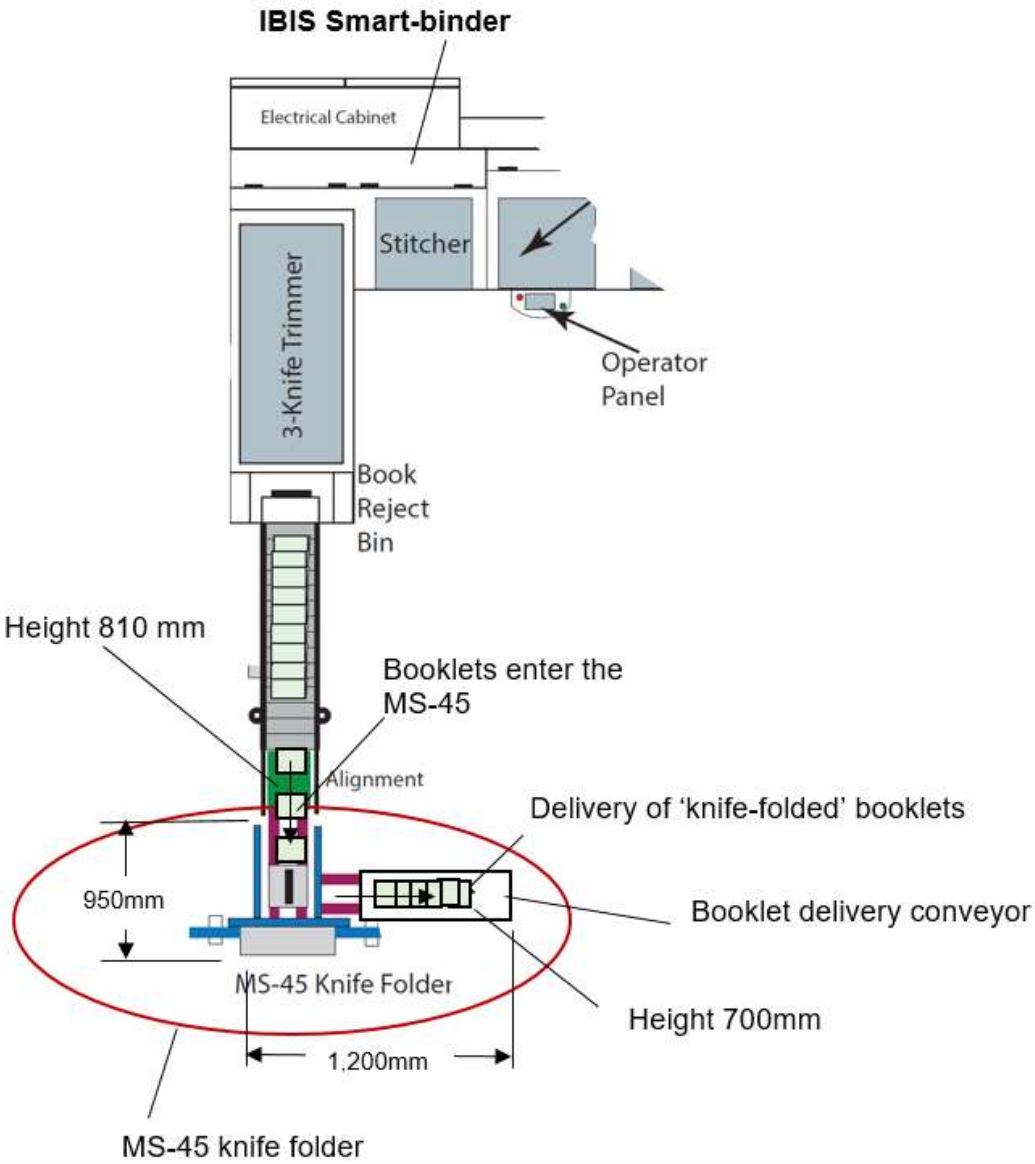
Appendix 26: Knife folder Option MS-45

The optional MS-45 knife folder is available to connect to the Smart-binder delivery conveyor.

The folder receives each booklet and knife folds it in the center. If 'down folding' then booklets are delivered to the left and if 'up folding' then booklets are delivered to the right (the fold unit can be rotated 180 degrees to allow either configuration)

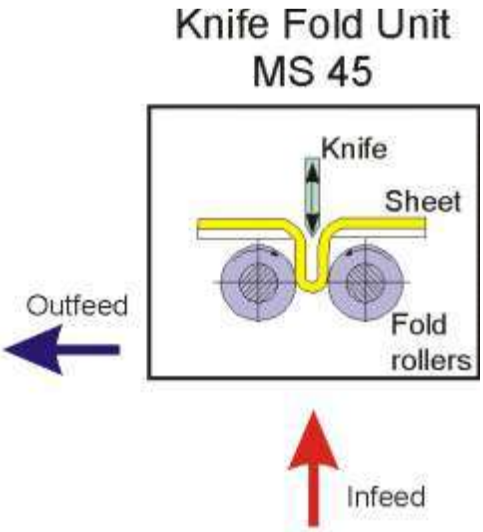


Smart-binder connected to in-line MS-45 knife folder delivering to the left (set for 'down fold')



Fold direction and heights

The MS-45 will be normally be set to do a 'down fold' and deliver to the left
(note: if an up fold is preferred then the fold will deliver to the right which is not so convenient for the machine operator).



The infeed height to the knife-folder is about 810mm (requires the Smart-binder delivery conveyor to be raised slightly) and when 'down folding' the delivery conveyor height is 700mm.

MS-45 Basic Specifications (when connected to Smart-binder)

Booklet size before folding

Book Width : min 120mm max 225mm
Spine length: min 210mm max 320 mm

Heights

Infeed height: 810mm
Outfeed height (assuming down fold): 700mm

Maximum speed : 7000 books /hour (to match maximum Smart-binder speed)

Maximum booklet thickness:

Approximately 20 pages (0.5mm)

Note: the thicker the booklet, the more evidence there will be of spine wrinkling at the corner of the booklet after the knife fold.

Appendix 27:
Book Stacker BSS-30

The BSS-30 book stacker allows non-stop Smart-binder operation without the need for the operator to continually have to remove books from the delivery conveyor. Books pass through the standard Smart-binder delivery conveyor into the BSS-30 stacker where they collect into piles up to 160 mm high. The number of books in each pile is selectable by the machine operator

Book piles are delivered onto a roller table where they accumulate until removed by the operator. In-line (or off-line) pile 'banding is also available.

Completed stacks contain booklets (or signatures) with spines all orientated in the same direction.

An alternative version of this stacker is available with an additional automatic stack reject facility. This ejects any bad stacks in one direction (stacks which do not contain the correct booklets of signatures in the correct sequence) and delivers all good stacks in a different direction. This version stacker includes a code reader to read incoming booklets or signatures

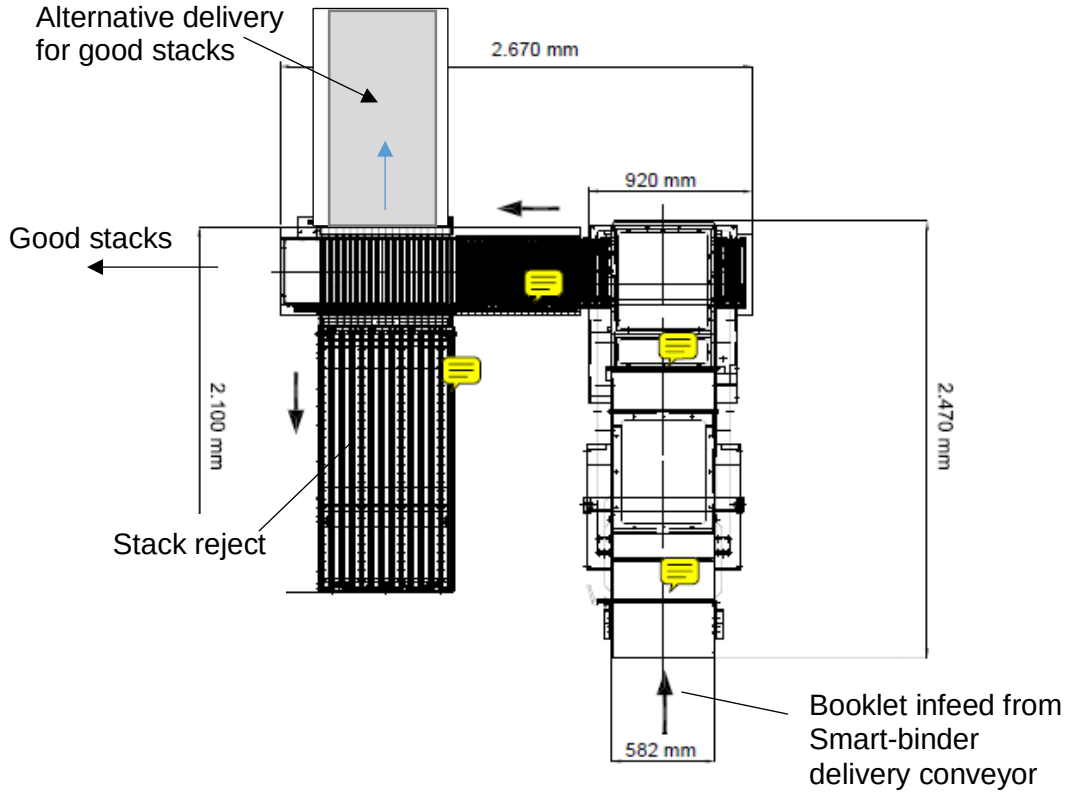
If making book blocks for perfect binding, then a cold glue applicator may be added which glues the signatures inside each book block. This may be used to aid the transportation of these book blocks into a perfect binder.

BSS-30 stacker specifications (2 versions available with different widths)

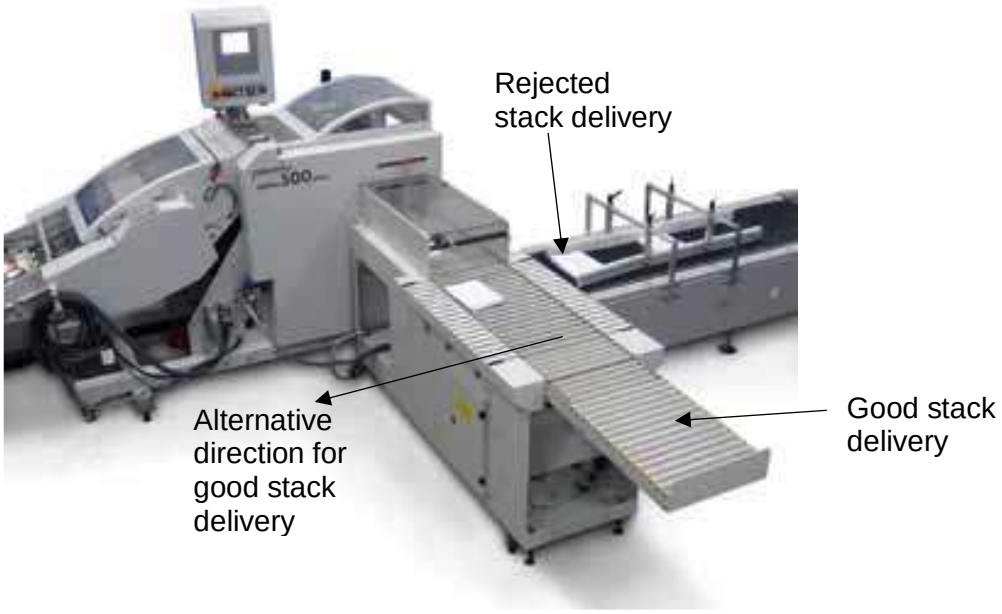
alpha	**500plus**	**Formate:** min 1 up max 2 up max (optional) 3 up max (optional)	**Infeed width** 80 mm (3 1/4") 510 mm (20") 235 mm (9 1/4") 150 mm (6")	**Infeed length** 95 mm (3 3/4") 330 mm (13") 330 mm (13") 330 mm (13")
alpha	**700plus**	**Formate:** min 1 up max 2 up max 3 up max (optional) 4 up max (optional)	**Infeed width** 80 mm (3 1/4") 760 mm (30") 350 mm (13 3/4") 235 mm (9 1/4") 155 mm	**Infeed length** 95 mm (3 3/4") 330 mm (13") 330 mm (13") 330 mm (13") 330 mm (13")
Max stack height		160 mm		
Min stack height		3 mm		
Speeds		15 - 205 m/min		
Performance		900 stacks per hour per up-work		
Electrical connection		16 A, 400/230 v, 3.5 kw		
Compressed air consumption *Signal connection is MBO 24 pin as standard*		100 l/min net, 6 bar (with air blast device 250 l/min) Dry filtered air on site		

BSS-30 Floorplan, showing optional stack reject lane

(BSS-30 may be to the left as shown below, or to the right):



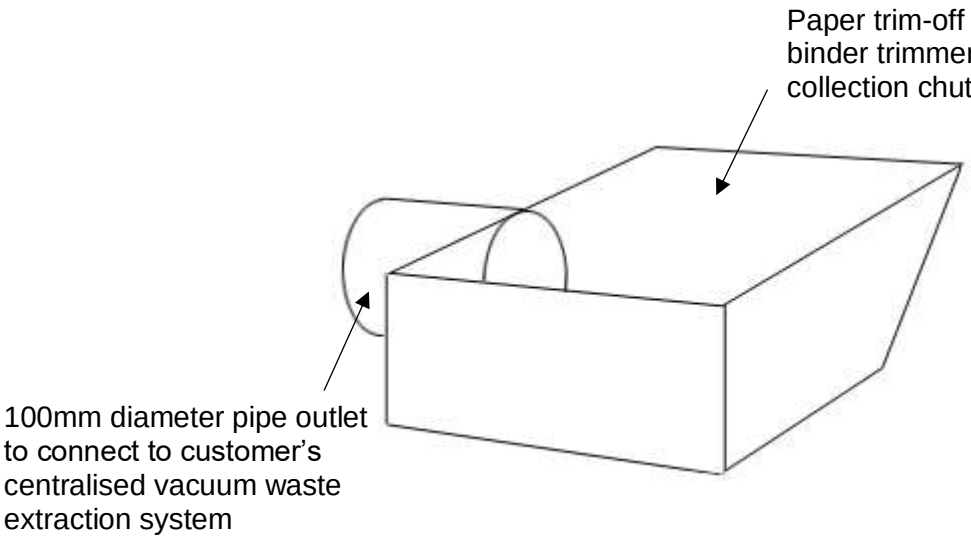
BSS-30 with Optional stack reject (shown below with delivery to the right, but may be provided also with delivery to the left):



The above image shows good books being delivered ‘head leading’, but an alternative configuration can deliver good books in a different direction if preferred.

Appendix 28: Trimmer waste collection chute TCC-100

The waste collection chute TCC-100 may be installed below the Smart-binder 3-knife trimmer in place of the trimmer waste removal conveyor TWC-100:



Appendix 29: Pile strapper PS-100

The PS-100 pile strapper may be used directly after the BSS-10 or BSS-11 booklet stacker to apply a plastic material strap around each booklet pile:

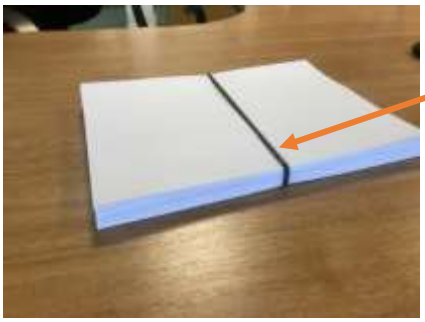
PS-100 pile strapper

BSS-11 or BSS-10 stacker

Smart-binder delivery

Delivery of strapped piles

The width of the plastic strap is typically about4mm (5/32”).



4mm wide plastic strap

Appendix 30: Selective folder F-200

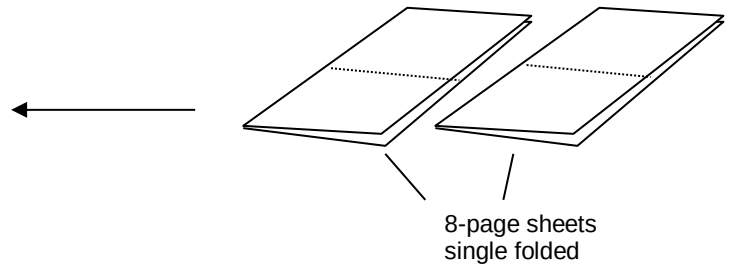
The optional F-200 selective folder is a dynamic version of the F-100 folder (see Appendix 13) which may be used to increase the maximum web speed from 130 m/min to approximately **160**-**180 m/min** when using a Smart-binder fed from a web cutter, while retaining the ability to build the book in 4-page increments (not 8-page increments as resulting from using the non-selective F100 or F101 folders). The F-200 also allows the web speed to be increased to about **200 m/min** if used in non-selective fold mode

When using the F-200, then sheets are printed to contain either 8 or 12 pages (either 4 pages on each side or 6 pages on each side). These sheets are then (buckle) folded either once, or twice, by the F-200 before they enter the SB and are (plow) folded again in the opposite direction by the SB plough folder.

For example: to produce **A4 books**, sheet is printed and cut to either approximately. 618mm long or 927mm long. These sheets enter the F200 short-edge leading. The 618mm sheet is cross folded once to give a 309mm folded section. The 927mm sheet is cross folded twice to give a 309mm folded section. These folded sections then enter the Smart-binder, and are processed normally thereafter into finished A4 books. If the number of pages in the book is divisible by 8 then all sections may contain only 8 pages. If the number of pages in the book is divisible by 4, but not by 8, then the book may be made with multiple 8-page sections followed by one 12 page section.

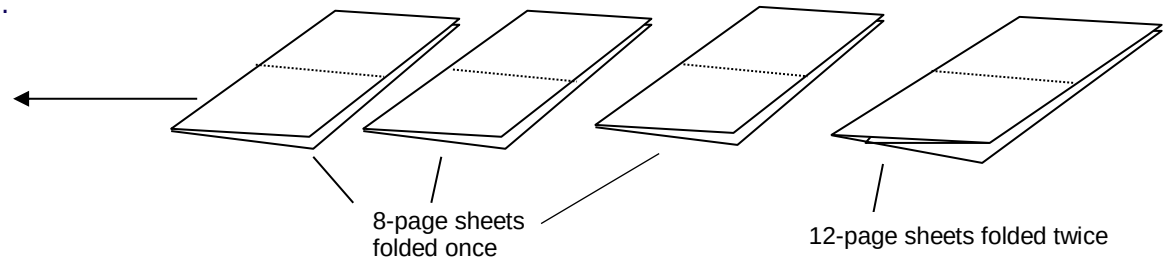
Output from the F-200 Folder

1/ If total number of pages in the book is divisible by 8:



2/ If total number of pages in the book is not divisible by 8:

.



Notes on the use of the F-200 folder

- Folded sections are more bulky than flat sheets, so this technique will reduce the maximum number of pages in the book, especially if using heavier weight paper stocks.
- The folding process may be deactivated if it is required to pass sheets through the F-200 without folding.
- When using ISG gluing together with pre-folded sheets, then a second cold-gluing nozzle must also be installed in the F-200 folder (to place a line of glue inside the folded sheet). See option FGS-100.
- The web cutter must also be able to change cut length on the run when using the F-200 selective folder

Appendix 31: Wire stitch head 43/6-S SST-101

(or with clincher, wire guides & wire spools SST-100)

43/6-S wire stitch heads may be used for booklets up to 7 – 8 mm thick.

For 2-up booklet production using the trimmer center knife (and booklet thickness < 7mm) then 43/6-S stitch heads may be used (instead of 52/8-S stitch heads).

A 43/6-S stitch head, with clincher, guides and wire spool is part number SST-100. For 2-up booklet production four stitch heads are required. The additional two stitch heads (with clinchers, wire guides and spools) are part number SST-100-2.

We recommend customers carry a spare stitch head (ie without clincher, guides, spool) for their Smart-binder, part number SST-101.

43/6-S Wire Stitch Head

Technical Data	
Parameter	Standard Stitching
Crown width	12mm
Min distance between staples	43 mm (center-line to center-line)
Max stitching thickness	6mm
Max booklet thickness	7 – 8 mm
Wire diameter	0.4 – 0.6 mm (0.016 – 0.024”)

Appendix 32: Wire stitch head 52/8-S SST-106

(or with clincher, wire guides & wire spools SST-105)

52/8-S wire stitch heads may be used for booklets up to 10mm thick.

Smart-binders are normally supplied with two 52/8s stitch heads. To produce booklets with three stitches then an additional SST-105 wire stitch head (that includes clincher, wire guides and wire spools) is required. For 2-up booklet production then four stitch heads are required. **The two additional stitch heads with clinchers, wire guides and spools are part number SST-105-2.**

We recommend that customers carry a spare stitch head (ie without clincher, guides or spool) for their Smart-binder, part number SST-106.

52/8-S Wire Stitch Head

Technical Data	
Parameter	Standard Stitching
Crown width	14mm
Min distance between staples	52 mm (center-line to center-line)
Max stitching thickness	8mm
Max booklet thickness	10mm
Wire diameter	0.4 – 0.6 mm (0.016 – 0.024”)

Appendix 33: Guide to printing Smart-binder Codes

Contents

1 Purpose of the code

Document integrity checking and individual sheet tracking are built into the Smart-binder system. The Smart-binder identifies each sheet by reading a code printed on it as it enters the machine. As well as using information in this code to determine which sheets should be collated together to form a specific book, and uniquely identify that book, the code can be used to selectively apply processes (eg Perforation) to individual sheets or books. Details of the processing of each sheet are logged and information can be recovered from the log files to identify which books have been correctly processed and delivered and which were rejected and the reason why.

The minimum requirement is that the code on each sheet identifies the position of the sheet within a book and the total number of sheets that the book contains.

1.1 Sheet Number and Number of Sheets

This information is contained in 2 fields of 2 or 3 numeric characters for example:

This sheet (sheet 1) would be followed by sheet 2 of 4, 3 of 4 and 4 of 4 to form a complete book containing 4 sheets.

This determines which sheets are collated together to form a book, and only books that contain all the sheets from 1 to the total number in the correct order will be delivered.

The positions of the Sheet Number & Number of Sheets fields are fixed in the first 4 digits of the code and must be present.

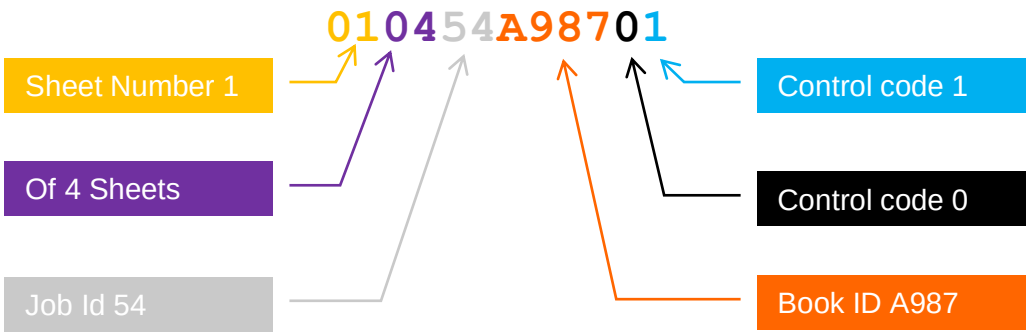
Additional characters (limited by the type of code used, and the capabilities of the code reader) can by used as:

2/ Book or Document Identifier (Book ID) – if the Smart-binder is set to check Book IDs it will ensure that all the sheets in a book have the same Book ID, rejecting any books that do not. This field can contain a unique book number and be used to ensure that sheets for different books are not collated together. It can also be used to match a separately fed cover or insert, which has the same Book ID printed on it, with content from the printer.

3/ Job Identifier (Job ID) – if the Smart-binder is set to check Job IDs it will create a gap on the delivery conveyor when the Job ID changes.

Book and Job Identifiers can overlap and may contain alphanumeric characters.

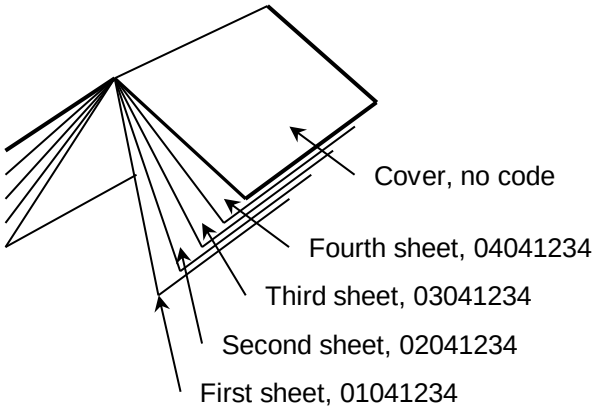
4/ Control codes for the various selective processing functions that the Smart-binder can perform.



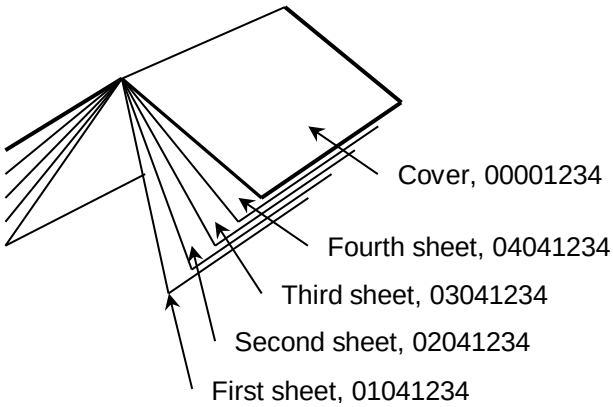
1.2 Example of 2 digit coding for saddle-bound books.

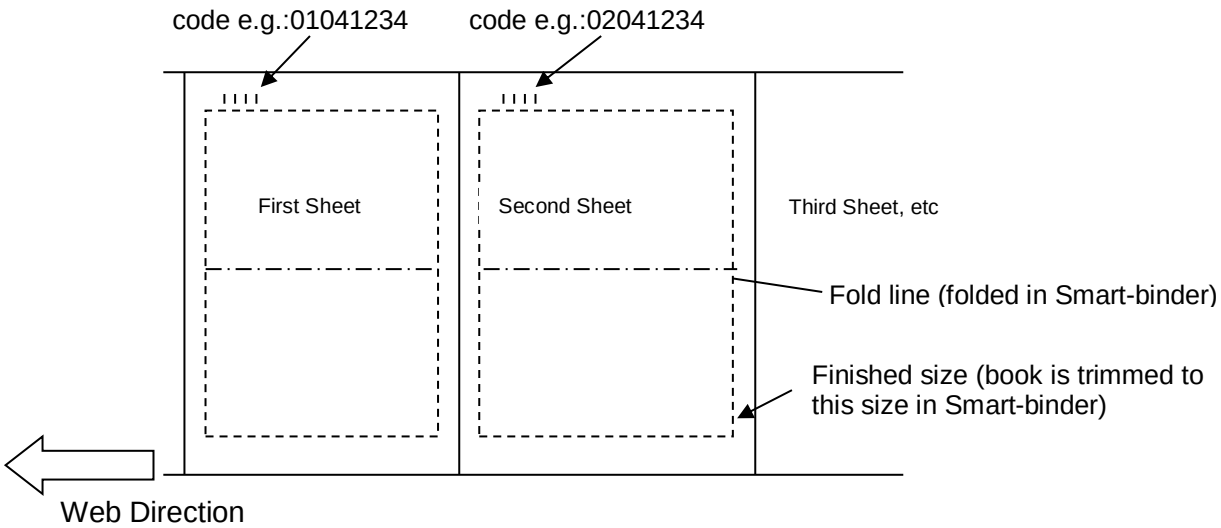
In this example, a “sheet” has 4 printed pages: the 16-page book is made up of 4 sheets of paper. The paper is printed on a web printer running in-line with the Smart-binder. If a separately-fed cover is added, then we describe this as a 16-page book plus cover. A book without a separate cover is usually described as ‘self–cover’.

16-page book, plus non-coded cover



16-page book, plus cover with Book ID





1.3 Selective functions

The characters that are used to perform these functions can be chosen from the Operator panel on the Smart-binder, and saved in a ‘setup’ so for example one application might use selective cover feeding and another not. The operator can change the setup in the Smart-binder, so that the control digit does not have to be included in the barcode when the function is not being used.

Selective functions only work if the appropriate options are fitted to the machine.

1. **Selective perforation**

   A single digit selects: no perforation, and either or both heads for each sheet.

2. **Selective binding**

   A single digit selects: no binding, stitching, or gluing. Gluing can be selected for each sheet.

3. **Selective cover/insert feeding**

   A single digit selects: no cover, feeder 1, or feeder 2. Selective cover feeding can be operated in either:

   Cover mode – only the control digit on the last sheet of the book is examined to determine if a cover should be fed.

   Insert mode – every sheet is examined to see if a cover is to be fed and the cover is fed on top of the sheet that has the activating value in the control digit.

1.4 Cover matching functions

To perform Cover matching each cover must be printed with a Book ID to match the sheets. This must appear in the same ‘position’ in the code as it does on the sheet with ‘0’ used to fill the places of sheet numbering or control codes.

Cover matching can be combined with Selective cover feeding, if the code on the sheet selects a cover but the code does not match the machine will stop with an error.

2 Format of the data in the code

2.1 Data Fields

Name	Description	Number of Characters	Type of characters	Required/Optional
SN	Sheet Number	2 or 3	Numeric	Required
NN	Number of sheets	2 or 3	Numeric	Required
CC	Control Code	1	Numeric	Optional, there can be several Control codes
BID	Book Identifier	Any	ASCII Printable	Optional
JOB	Job Identifier	Any	ASCII Printable	Optional

2.2 Composition of the fields into codes

The data format must be the same on all sheets or covers in a job.

2.2.1 Sheet Number (SN) & Number of sheets (NN)

Leading 0s must be printed (eg 01) white space is not permitted in the sheet number and number of sheets fields.

2.2.1.1 2 digit scheme for saddle binding

SN, in the range 01..NN, followed by NN, in the range 01..50. Optionally with by ‘CC’ , ‘BID’ and ‘JOB’ in any order.

2.2.1.2 3 digit scheme for perfect binding.

Typically used when perfect binding single sheets or once folded sheets from cut-sheet printers.

SN, in the range 001..NN, followed by NN, in the range 001..999. Optionally with ‘CC’, ‘BID’ and ‘JOB’ in any order.

2.2.1.3 2 digit scheme combining saddle binding and perfect binding

Typically used in SB4 systems in which the Smart-binder makes thin sections (of up to 9 sheets) which are then fed into a perfect binder which binds the sections together. The code is recognised automatically when the first digit is ‘9’.

Consists of a saddle binding part of 4 digits:

> ‘9’ followed by a single single digit (1..number of sheets) sheet number followed by ‘0’ followed by single digit ‘number of sheets’ (1..9).

Followed by a perfect binding part of 4 digits:

SN, in the range 01..NN, followed by NN, in the range 01..50.

Optionally with by CC, ‘BID’ and ‘JOB’ in any order.

All schemes also support ‘Reverse Numbering’ in which sheet NN of NN arrives first followed by NN-1, NN-2.. and sheet 1 of NN is the last sheet. This is selectable at the machine setup.

2.2.2 Control codes (CC)

Control codes must be in the range 0..9, white space cannot be used. They can be placed at any position after the sheet number/number of sheets, and configured in the job setup at the Smart-binder, they must be on every sheet if configured, but can be un-configured simply by changing the setup in the Smart-binder.

Perforation codes – apply to the sheet on which they are printed.

0= No perforation

1= Perforation with the operator side head

2= Perforation with the non-operator side head

3 = Perforation with both heads.

See Appendix 3 for coding when using 4 heads.

Binding codes

0= No binding, the sheet will not be glued & the book will not be stitched.

1 = Stitch – the value on the first sheet of the book determines whether the book is stitched.

2 = Glue this sheet – applies specifically to the sheet, but will be ignored on the first sheet.

Cover selection codes

0 = No cover or insert

1= Cover/insert from first feeder (nearest the stitcher)

2= Cover or insert from second feeder (further from the stitcher).

In ‘Cover’ mode – only the last sheet is checked

In ‘Insert’ mode – every sheet is checked, note that you can only insert following a sheet so it is not possible to put a centre insert in using this system. It is possible to feed multiple inserts from one feeder and to add inserts from both feeders to the same book.

2.3 Book ID

Book IDs are used to identify the sheets of a specific document, if a Book ID is selected all the sheets (and the cover if cover matching is used) must have the same Book ID or the book will be rejected.

Software from version 1.7.24 allows the inclusion of generic sheets (without a Book ID) in a book by printing a Book ID consisting of the '*' character in each position of the Book ID. This will match any Book ID printed on the other sheets and the book will be delivered.
For example a 3 sheet book with the following codes will be accepted:

01 03 540AZ
02 03 ****
03 03 540AZ

This would allow sheet 2 to be offset printed, collated with digitally printed sheets 1 & 2 to form a pile, and fed into the Smartbinder from a Pile feeder.

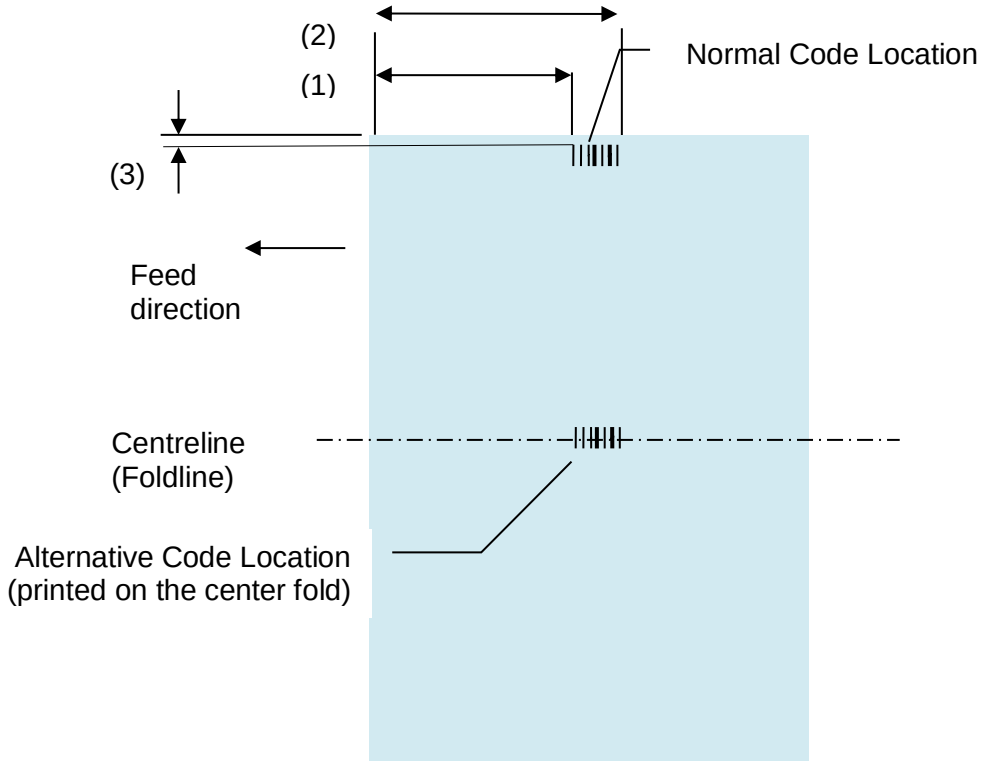
The generic Book ID feature cannot be used with ITF barcodes as they do not provide the '*' character. Use 2D codes, CODE39 or CODE128.

2.4 Job ID

Job IDs can be used to separate booklets on the delivery, by creating a gap when the Job ID changes, generic codes '*' are **not** recognised in the Job ID.

3 Where to print the code

3.1 When reading on the infeed of the Smart-binder



For inline operation with cutters (see Appendix 4 for position of code on Smart-binders up to serial #145).

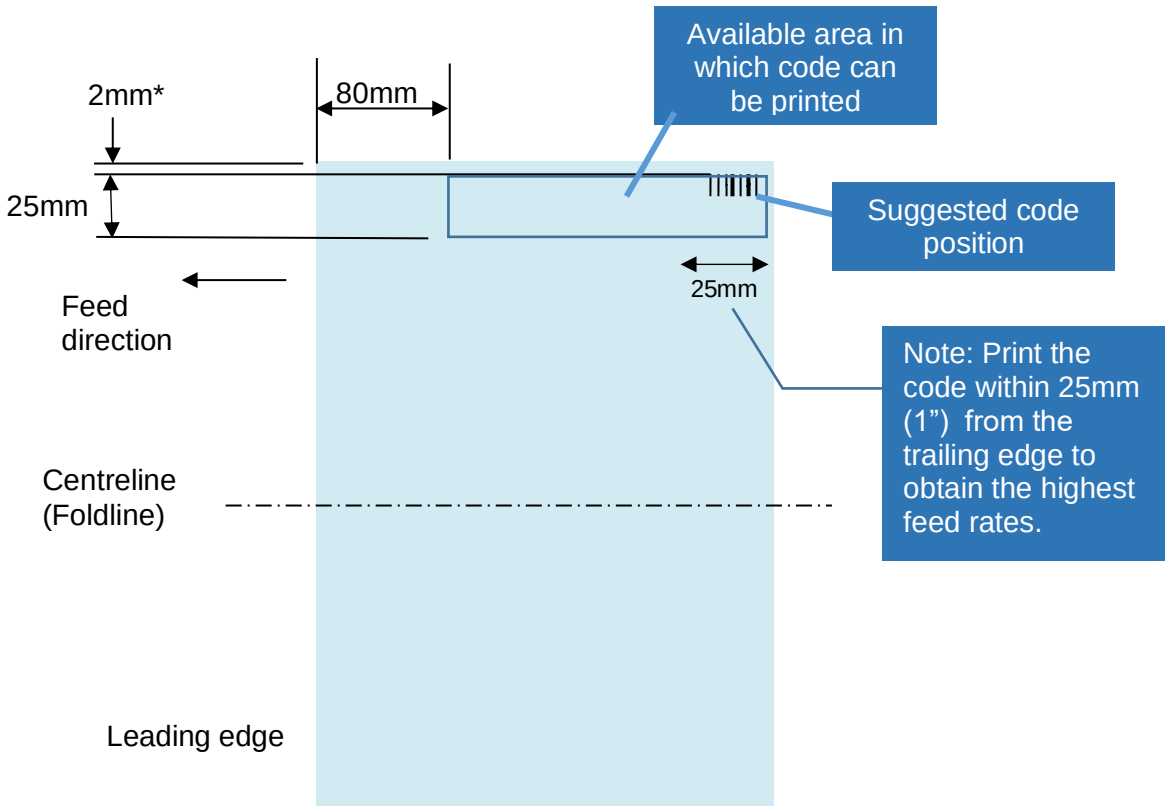
Dimension	Linear code	2D code
(1) Minimum distance from leading edge of sheet	170mm (6.7”)	170mm (6.7”)
(2) Maximum distance from leading edge of sheet	Up to trailing edge of sheet	240mm (9.4”)
(3) Minimum distance from edge of sheet	Can be printed to edge of sheet	Quiet zone defined for code (see 4.2)
Minimum width	Depends on reader (see 4.1)	

For SBS100 Buffer

Dimension	Linear code	2D code
(1) Minimum distance from leading edge of sheet	5mm (0.2”)	5mm (0.2”)
(2) Maximum distance from leading edge of sheet	15mm (0.6”)	15mm (0.6”)
(3) Minimum distance from side of sheet	Can be printed to edge of sheet	Quiet zone defined for code (see 4.2)
Minimum width	Depends on reader (see 4.1)	

3.2 When reading the code in a sheet pile feeder

Applies to options: SB-095 (off-line operation) or SB-097.



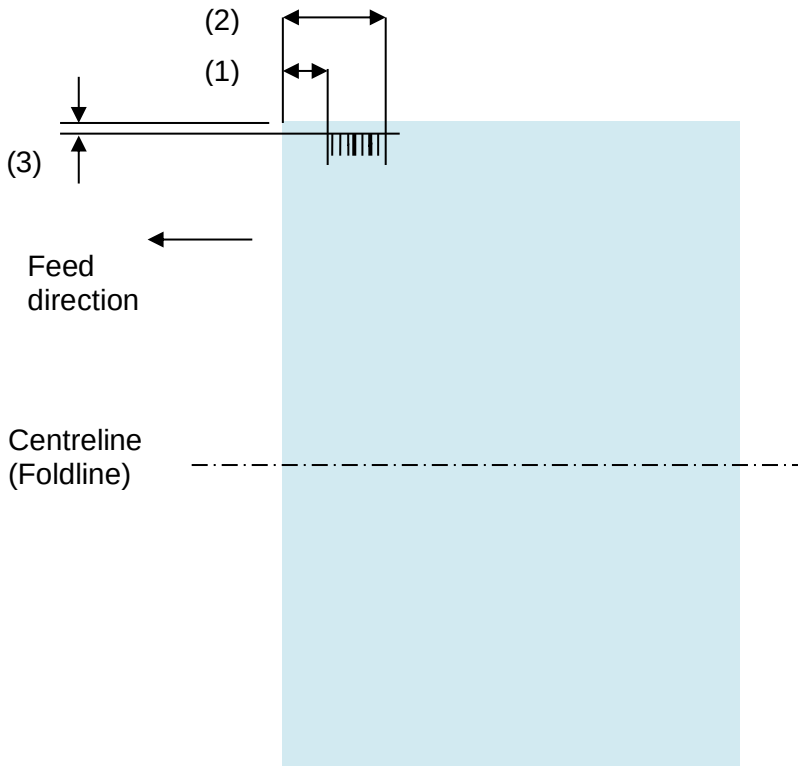
Notes

Minimum code width depends on the reader used (see 4.1)

* Codes must be printed a small distance away from the edge of the sheet. This is because the sheet moves slightly as it is picked up by the separator and this can expose the code on the sheet below, hence preventing the reader from decoding the code on the top sheet.

**The code must be positioned no more than about 25mm from the edge of the sheet. This is becasue there are parts of the feeder which prevent the code reader from being moved to these positions .

3.3 When reading the code in a cover/insert feeder



Dimension	Linear code	2D code
(1) Minimum distance from leading edge of sheet	50mm (2”)	45mm (1.75”)
(2) Maximum distance from leading edge of sheet	140mm (5.5”)	65mm (2.5”)
(3) Minimum distance from edge of sheet	Can be printed to edge of sheet	Quiet zone defined for code (see 4.2)
Minimum width	Depends on reader (see 4.1)	

4 Code types

4.1 Linear codes

ITF – Industrial 2of5, numeric characters only (0-9), digits are encoded in pairs so there must be an even number of them.

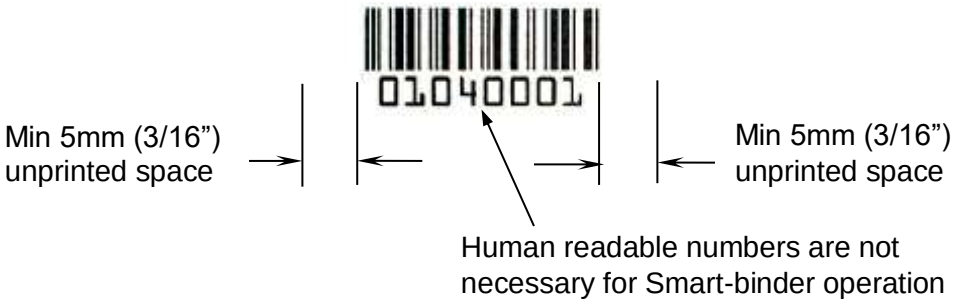
CODE39 – alphanumeric characters, however, it takes up more space because it encodes more characters.

CODE128 – has numeric only & alphanumeric forms, the reader automatically detects the correct type, the numeric form is compact like ITF.

Quiet zones

Linear codes require space ahead of and following the code to allow the reader to discriminate it from other printer marks.

For linear codes leave 5mm clear paper at either end.



Size

The minimum width of the code depends on the reader:

BL180	6mm
MS3	4mm

However, wider codes can always be read more reliably so we recommend that codes are as wide as possible.

For ITF codes:

When using a font based code we recommend that the font is at least 26pt (which produces a code approximately 29mm (1⅛") for an 8 digit code.

Do not include check digits in the code, ITF code generators add a padding digit because an ITF code must have an even number of digits, typically they place this at the start of the code which prevents the sheet number & number of sheets fields from being decoded.

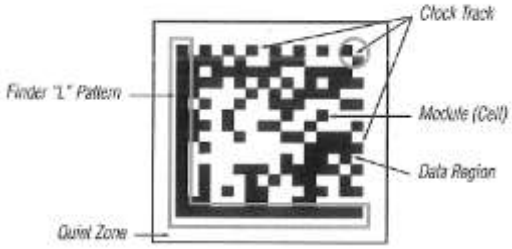
4.2 2D Codes

Datamatrix – 2D code is a compact way of encoding alphanumeric data, can contain hundreds of characters (whereas it is usually not possibly to read linear codes containing more than 16 characters on moving sheets).

QR – similar toDatamatrix, commonly used in Japan as it can encode Kanji/Kana character sets. Widely used these days to encode URL's that you can scan with your phone.

Quiet Zone

2D codes require a quiet zone of at least 1 cell width all round which is why they cannot be printed up to the edge of the sheet.



Size

For web speeds up to 150m/min the minimum cell size for use with the 2D reader (Microscan Mini Hawk) is 0.4mm (0.015"). Larger cells can help to make reading more reliable.

Capacity ofDatamatrix ECC200 codes

Size (cells)	Size (mm) for 0.4mm square cell	Numeric characters only	Alphanumeric characters
10x10	4	6	3
12x12	4.8	10	6
14x14	5.6	16	10
16x16	6.4	24	16
18x18	7.2	36	25
20x20	8	44	31
22x22	8.8	60	43

Larger capacity codes (using more cells) are available but they have to be more than10mm (3/8") squareto meet the minimum cell size needed to read the moving code.

DataMatrix codes can be rectangular (eg 8x32) which can be useful if trim-off is limited.

QR codes are approximately 15% larger than Datamatrix codes of the capacity, for example a 21x21 QR code holds 41 numeric or 25 alpha numeric characters (similar to an 18x18Datamatrix) with the lowest level of error correction. They take slightly longer to decode but that does not affect their use with Smart-binder as the readers decode much faster than sheets can be fed.

QR codes must be at least 21 modules square (so their minimum size is about 8mm (0.3") square.

4.3 Selecting the reader

Code	BL180	MS3	Quadrus mini velocity	Quadrus mini hawk	Quadrus micro hawk
ITF	✓	✓	✓	✓	✓
CODE39	✓	✓	✓	✓	✓
CODE128	✓	✓	✓	✓	✓
DataMatrix			✓	✓	✓
QR			✓	✓	✓

BL180 CCD reader, fitted as standard to Smart-binders until 2014, will read codes of up to about 14 characters at web speeds up to 100m/min. The code must be 6mm wide for this reader.

MS3 Laser reader, fitted as standard to new Smart-binders from 2014 on, will read codes of up to about 16 characters at web speeds up to 150m/min.

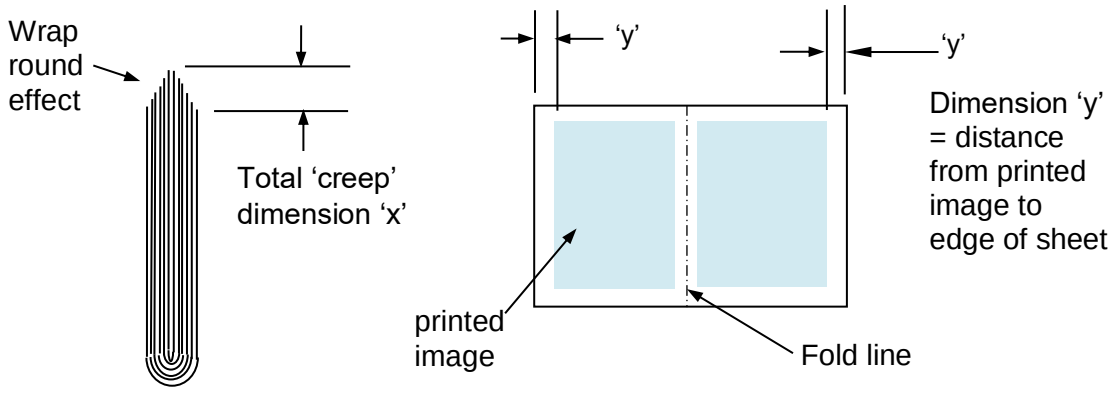
Quadrus mini velocity, fitted as an option to read 2D codes on Smartbinders and as standard on SCFs until 2014, will read on web speeds up to 100m/min.

Quadrus mini Hawk, fitted as an option to read 2D codes on Smart-binders and as standard on SCF's fron 2014, will read on web speeds up to 150m/min.

Quadrus micro Hawk, fitted as an option to read 2D codes on Smartbinders from 2019, will read on web speeds up to 150m/min.

5 Appendix 1 – Image creep

When producing saddle-stitched or thin ISG-glued books, the thickness of the spine causes the outer sheets to appear shorter than the inner sheets when looking at the front edge of the untrimmed book. This is called the 'wrap round' effect. The Smart-binder trims this edge to create a square edge to the book, but, unless this effect is taken into account when impositioning the pages of the book, the print on the inner pages will not line up with that on the outer pages. The effect of this is referred to as image 'creep'.



When impositioning the printed image on each sheet dimension 'y' must increase by the amount 'x' from the outer sheet to the innermost sheet. If there are 32 sheets in the book then 'y' increases by 'x'/32 from one sheet to the next sheet.

The relationship between the total creep dimension 'x' and the total number of sheets and pages in the book for different paper weights is shown in the table below. For book thicknesses not shown, interpolate values from the table, e.g.: for a 9-sheet (36 page) book, use the value for 'x' half way between those for 6 and 12 sheets. For thinner books than those shown, it is not usually necessary to compensate for image creep.

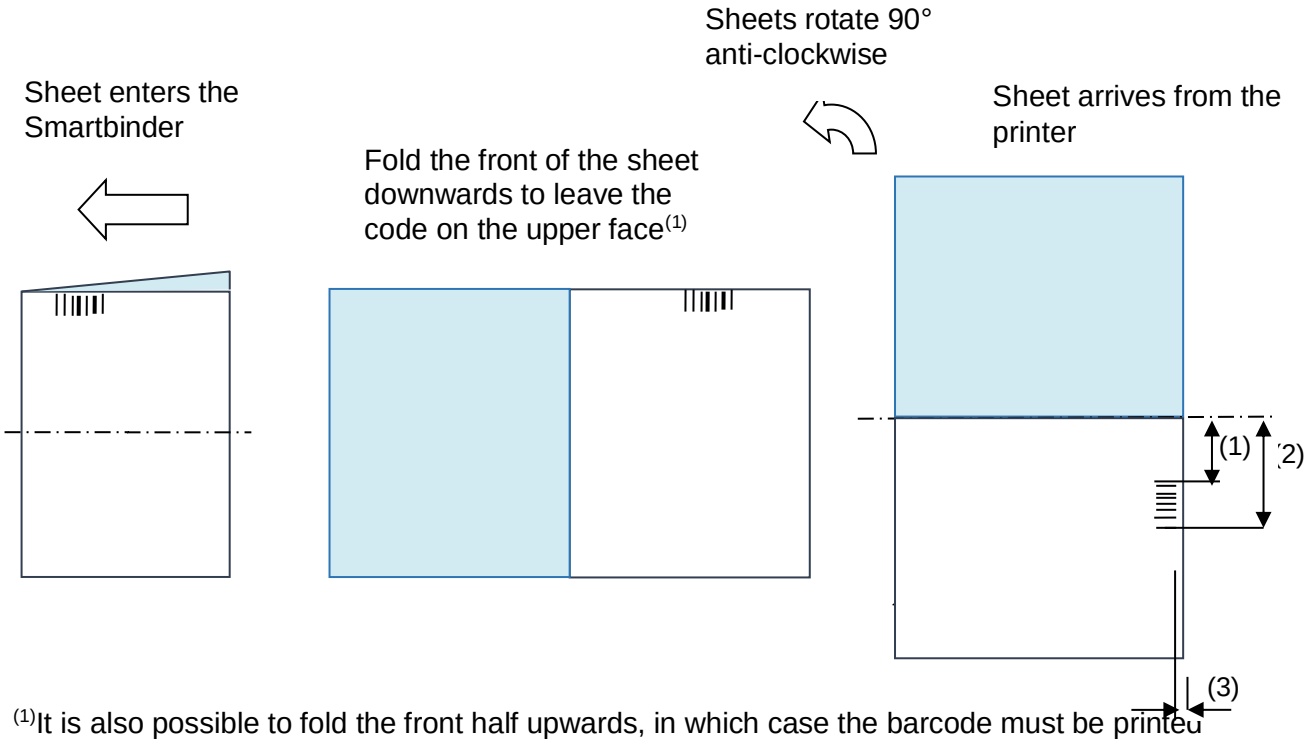
If a separate cover is used, its page layout should be arranged to align with the outer sheet.

Paper stock weight													
Gsm		60		70		80		90		100		110	
Lb bond		16		19		21		24		27		29	
Lb offset		41		47		54		61		67		74	
Sheets in book	Pages in book	Approximate total creep dimension 'x'											
		mm	inch	mm	Inch	mm	inch	mm	inch	mm	inch	mm	inch
6	24	1.2	0.05	1.4	0.06	1.6	0.06	1.8	0.07	2.0	0.08	2.2	0.09
12	48	2.3	0.09	2.7	0.11	3.1	0.12	3.5	0.14	3.9	0.15	4.3	0.17
18	72	3.5	0.14	4.1	0.16	4.7	0.19	5.3	0.21	5.9	0.23	6.5	0.25
24	96	4.7	0.19	5.5	0.22	6.3	0.25	7.1	0.28	7.9	0.31	8.7	0.34
30	120	5.9	0.23	6.9	0.27	7.9	0.31	8.9	0.35	9.9	0.39	10.9	0.43
36	144	7.1	0.28	8.2	0.32	9.4	0.37	10.6	0.42	11.8	0.46	NA	NA
42	168	8.3	0.32	9.6	0.38	11.0	0.43	NA	NA	NA	NA	NA	NA
48	192	9.5	0.37	11.0	0.43	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not available (this is outside the Smart-binder SB-1, SB-2, SB-3 thickness specification)

6 Appendix 2 – Rotating and folding sheets in the RF100

Rotating and folding A3+ sheets to make 8pp A4+ signatures, shown in a typical right to left flow



(1)It is also possible to fold the front half upwards, in which case the barcode must be printed on the under side of the front half of the sheet.

For inline operation with cutters (see Appendix 4 for position of code on Smartbinders up to serial #145).

Dimension	Linear code	2D code
(1) Minimum distance from centreline of sheet	170mm (6.7”)	170mm (6.7”)
(2) Maximum distance from centreline of sheet	Up to trailing edge of sheet	240mm (9.4”)
(3) Minimum distance from edge of sheet	Can be printed to edge of sheet	Quiet zone defined for code (see 4.2)
Minimum width	Depends on reader (see 4.1)	

7 Appendix 3 – Control codes for 4 Perforator Heads

The 1 digit Control Code uses a hexadecimal representation of a 4 bit binary code in which bits 0-3 control heads 1-4 respectively.

CC 1 digit	Head 1	Head 2	Head 3	Head 4
0				
1	✓			
2		✓		
3	✓	✓		
4			✓	
5	✓		✓	
6		✓	✓	
7	✓	✓	✓	
8				✓
9	✓			✓
A		✓		✓
B	✓	✓		✓
C			✓	✓
D	✓		✓	✓
E		✓	✓	✓
F	✓	✓	✓	✓

The 2 digit Control Code (for use when only numeric characters are available) uses the numbers decimal (0-3) representation of 2 bits with the first digit controlling heads 1 & 2, and the second heads 3 & 4.

CC 1st digit	CC 2nd digit	Head 1	Head 2	Head 3	Head 4
0					
1		✓			
2			✓		
3		✓	✓		
	0				
	1			✓	
	2				✓
	3			✓	✓

1 or 2 digit Control codes can be selected on the Smart-binder touchscreen (and saved as part of a setup).

For example, to select all 4 heads:

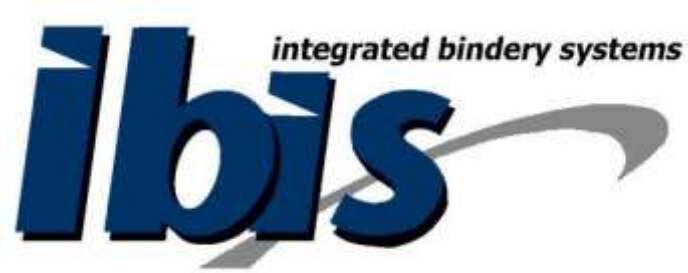
With 1 digit **F** With 2 digits **33**

8 Appendix 4 – Position of codes for operation inline (older machines).

For machines up to serial number #145 (unless retrofitted with cover autoloader)

Dimension	Linear code	2D code
(4) Minimum distance from centreline of sheet	50mm (2”)	60mm (2.35”)
(5) Maximum distance from centreline of sheet	Up to trailing edge of sheet	80mm (3.15”)
(6) Minimum distance from edge of sheet	Can be printed to edge of sheet	Quiet zone defined for code (see 4.2)
Minimum width	Depends on reader (see 4.1)	

Produced by:



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