

Smart-binder 'PLUS HS' Product Guide

Revision 30 (July 2018)

Smart-binder Systems

Models SB-1, 2 or 3

for the production of saddle-bound books, and

Model SB- 4 or SB-5

for both saddle-bound and perfect bound books

(see separate Product Guides for IBIS 'Sprint-binder' PB-600 and PB-1200 Perfect Binding systems)



This Guide is revision 30: July 2018

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Document Revision History

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01	06/04/04	Minimum and maximum book sizes clarified.
02	26/11/04	Revised compressed air requirements item 9.7.2.
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27	11/12/15	Rev 27e : added new bar code spec
28	16/03/16	Rev 28: general update

29	300317	Rev 29: Miscellaneous updates, including adding new code spec and reducing SB-W max book width to 273mm
30	260718	Rev 30: added improved info to help choose in-line, near-line , or off-line SB

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

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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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1 Press release: **SADDLE-STITCHED AND GLUED BOOKS FROM THE IBIS 'SMART-BINDER PLUS'**

Why restrict your finishing machine output to saddle-stitching only, when you can produce both stitched and glue-bound books from one machine? The '**SMART-BINDER**' finishing system from UK manufacturer '**IBIS Integrated Bindery Systems**' can provide just that :



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

Models SB-3, 4 and 5 offer both conventional saddle-stitching (**wire stapling**) and IBIS's unique, patented sheet-gluing process called **Individual Sheet Gluing (ISG)**: both on the same machine. When making ISG cold glued booklets the bar-coded sheets arrive at speeds up to **180 metres/min**, are individually folded, glued precisely on the fold line and then collected together with optional insert sheets and/or cover sheet, before being 3-knife trimmed. Alternatively, conventional saddle-stitched (wire stapled) books may be produced. **Book thickness may be automatically varied** on-the-run using **bar codes** to control sheet, cover and insert-sheet sequence, for true 'bind-on-demand' non-stop operation. The ISG cold glue process replaces the need for separate stitching and glue-binding equipment and provides many benefits over conventional wire stapling for booklets up to 10mm thick. The cost of the cold glue is similar to wire staples, but advantages include book lay-flat quality, ease of recycling and page pull strength.

The extended model Smart-binder SB-X offers an increased booklet spine length of 457mm and is able to produce A5 portrait books in 2-up mode (using the optional trimmer centre-knife).

For finishing applications, which require only saddle-stitched book output, IBIS offer the **Smart-binder model SB-1** (for use in-line with cut-sheet printers) or **higher speed SB-2** (for web printers). The model SB-3 includes also IBIS's ISG saddle-gluing system. All IBIS products 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.

Smart-binder models SB-4 and SB-5 allow for production of both saddle-bound booklets (up to 8-10mm thickness) and also **perfect-bound** books (up to 60mm thick). The SB-4 uses ISG cold glue to create **cold-glued 'signatures'** (typically containing between 16 and 24 pages) which enter the clamp(s) of the in-line hot-melt binder for hot-glue (EVA or PUR) and cover application. The SB-5 comprises a saddle-stitcher and an independent (in-line) perfect binder. IBIS's **Sprint-Binder** range of in-line PB-600, PB-1200 and PB2000 Perfect Binders provide 'perfect bound' books only. An in-line thick-book trimmer is used to complete the system.

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 not include the SB-1 which is a lower speed Smart-binder for use only in-line with low speed printers at up to 180 sheets/min.*

	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)	7,000 booklets/hour (1-up) 14,000 booklets/hour (2-up using optional trimmer center-knife).	Saddle stitching Wire stapling 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)	<ul style="list-style-type: none"> • 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.
		Up to 130 metres/min web speed					
Saddle-stitching + saddle gluing (ISG)	Smart-binder SB-3 'PLUS HS'	Up to 180 metres/min web speed (with extra buckle-folder)		Saddle-binding Wire-stapling and ISG cold glue binding (Can be upgraded to include also perfect binding : SB-4 or SB-5, see next page)		Covers use same folder as sheets.	<p><i>Additional features:</i> Includes also IBIS's patented cold-glue binding process (ISG) <u>in addition to</u> conventional saddle-stitchin).</p>

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 A5 = 200 sheets/min).

Note 2: Smart-binder model 'SB-X' increases maximum spine length to 457mm to allow 2-up 8 ½ x 5 ½" (or A5) portrait booklet production.

Note 3 : Smart-binder model 'SB-W' increases the maximum untrimmed book width to 273mm (10 ¾").

2/ Perfect binding (hot-glue binding)

	Model	Max Throughput speed	Binding method (s)	Max book thickness	Cover feeding	Key Features
Perfect Binding only	Sprint-binder PB-600B	400 books /hour	Perfect binding only <i>Hot-melt glue (or optional PUR)</i>	60mm	Perfect binder includes integrated cover feeder Feeds covers from top of pile (stop to reload) Up to 6 cover creases	Suitable for use with cut-sheet printer Auto-setting Off-line hand feeding position. Optional in-line book trimmer EVA or PUR glue
	Sprint-binder PB-600R	400 books /hour		60mm	Perfect binder includes integrated cover feeder Feeds covers from bottom of pile (allows reload on the run)	
	Sprint-binder PB-1200R	1200 books /hour		60mm	Up to 4 cover creases	

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 are capable of producing 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 is 90 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 a number of 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, in order to 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.

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

Finishing: The conversion of sheets into booklets or books.

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

Gsm: Grams per square metre (paper stock weight)

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 web in order to 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.

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 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: 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').

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 a number of 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 everything together. The resulting book spine has 90 degree 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 a number of 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 by 90 degrees

Saddle-stitching: The process of collecting folded sheets astride an inverted 'V' shaped 'saddle' and then stapling 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, in order to 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 a number of times. When using the Smart-binder SB-4 then a signature may also apply to a number of 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 book.

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

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: A small length of wire which passes through a number of sheets and is then bent back on itself in order to attach these sheets together.

Stitching head: A mechanical 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 trim 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 cpable 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 1992 as amended 1994. (89 /392 /EEC).

The Electrical Equipment (Safety) UK Regulations 1994. (72 /23 /EEC).

The Electromagnetic Compatibility UK Regulations 1992. (89 //336 /EEC).

4.3 *Standards*

EN60950

EN50081-1 (Residential Commercial and Light Industrial Environment).

EN50082-2 (Industrial) to meet European requirements.

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

UL 60950

5 Smart-binder 'PLUS' main user-features and benefits



1) A True 24/7 Production System

With **100 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 to 8-10mm 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 Sprint-binder 600 or Sprint-binder 2000 **hot-melt perfect binder** for very high quality thick books with square spines. The Sprint-binder includes 3-roller gluing, side gluing and up to 6 cover creases: 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 (2.36") thick, or hot-glue perfect-bound books up to 60mm (2.36") 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**. The maximum recommended booklet production speed (for optimum book trim quality) is **6,000 booklets per hour** (12,000 in 2-up mode). It can accept sheets at a rate of **450 sheets/min** and handle printer and unwinder web speeds up to **180 metres/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 similar to wire staples. Quick changeover is available between stapling 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 loose 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 **positive** personalized cover to-book text matching via barcode scanners mounted on the cover feeder and sheet infeed register table.

9) Tabloid size output, or 2-up A5 landscape

The new 'stretched' model Smart-binder SB-XW is able to produce 2-up **A5 portrait booklets** at up to 10,000 booklets/hour, or **A4 landscape (oblong)** or **tabloid sized** output at 5 - 6,000 per hour

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

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

11) Customization:

The SB 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.

12) 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 Smart-binder system description and options

6.1 Smart-binder Configurations

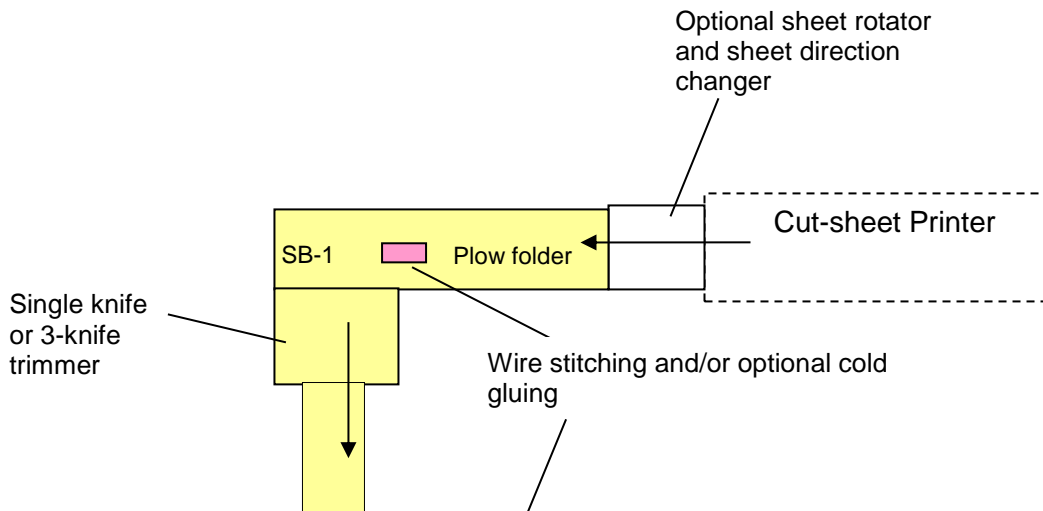
Using the “fold-bind-trim” process, the Smart-binder (SB) produces either wire-stitched (saddle-stitched) booklets or cold-glued booklets up to a maximum of 10mm (0.39”) thick. The optional addition of a ‘perfect binder’ (hot glue binding) PB-600 or PB-12000 allows glued books to be produced up to a maximum of 60mm (2.36”) 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).

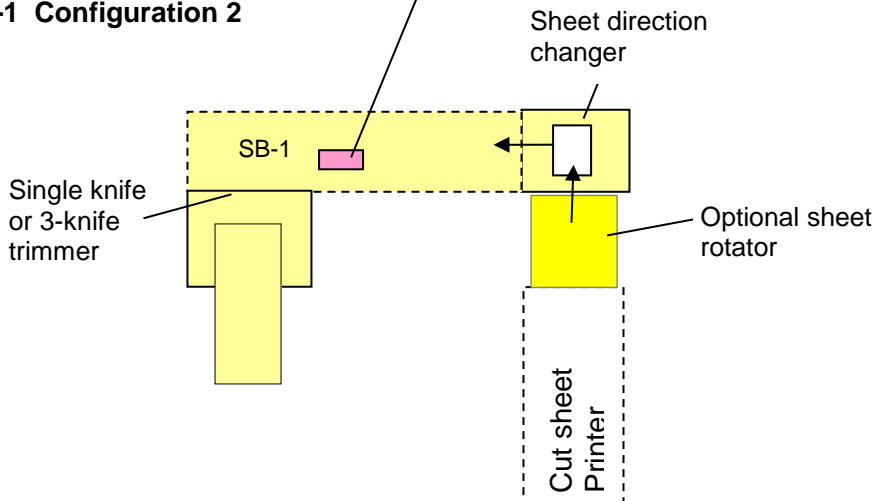
Various different model Smart-binders are available (each upgradeable from the preceding model):

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

- **SB-1 Configuration 1**

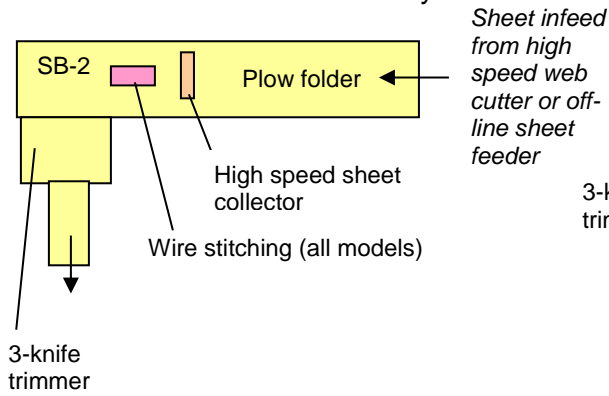


- **SB-1 Configuration 2**

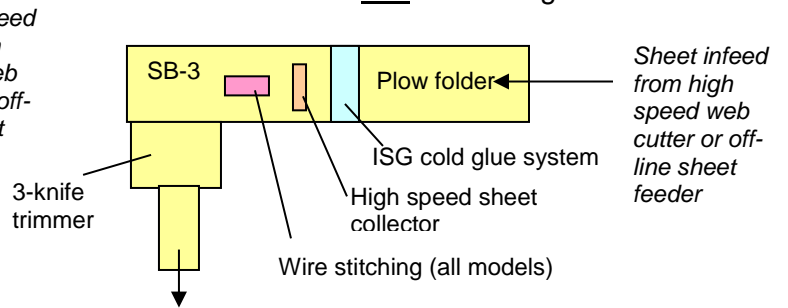


Smart-binder models SB-2 , SB-3 (and stretched model SB-XW)

Smart-binder SB-2
(High-speed applications)
Saddle-stitched booklets only.



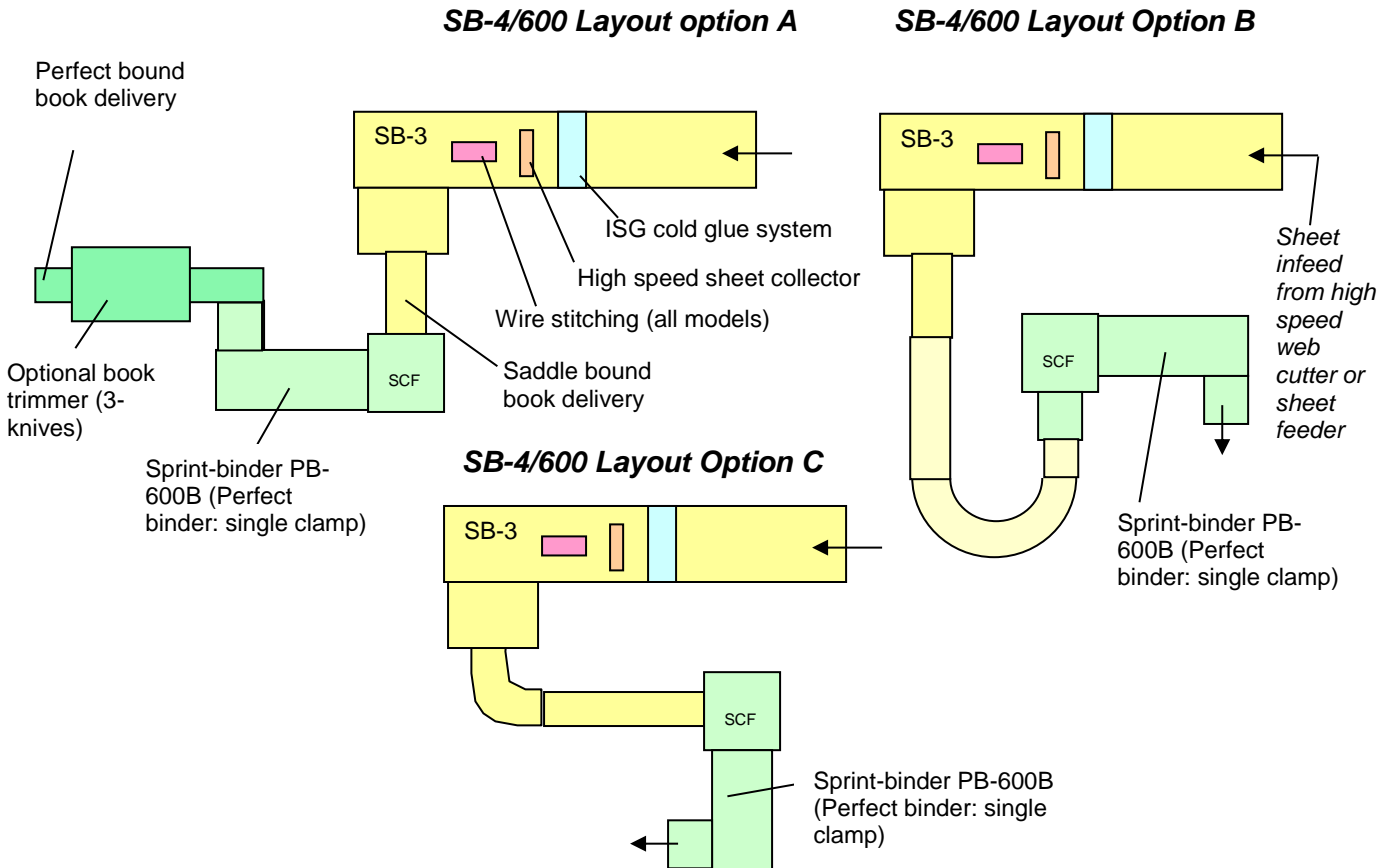
Smart-binder SB-3
(High-speed applications)
Saddle-stitched and ISG cold-glued booklets.



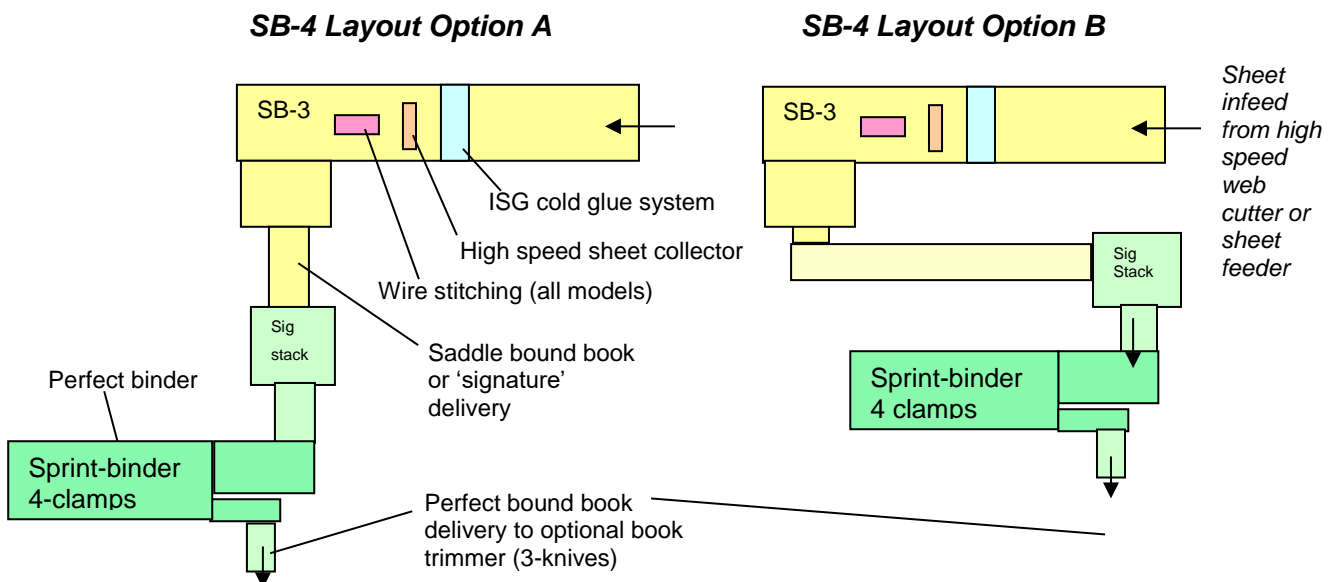
Smart-binder SB-4

Smart-binder SB-4/600 (SB-3 with Sprint-binder PB600B single-clamp perfect binder):

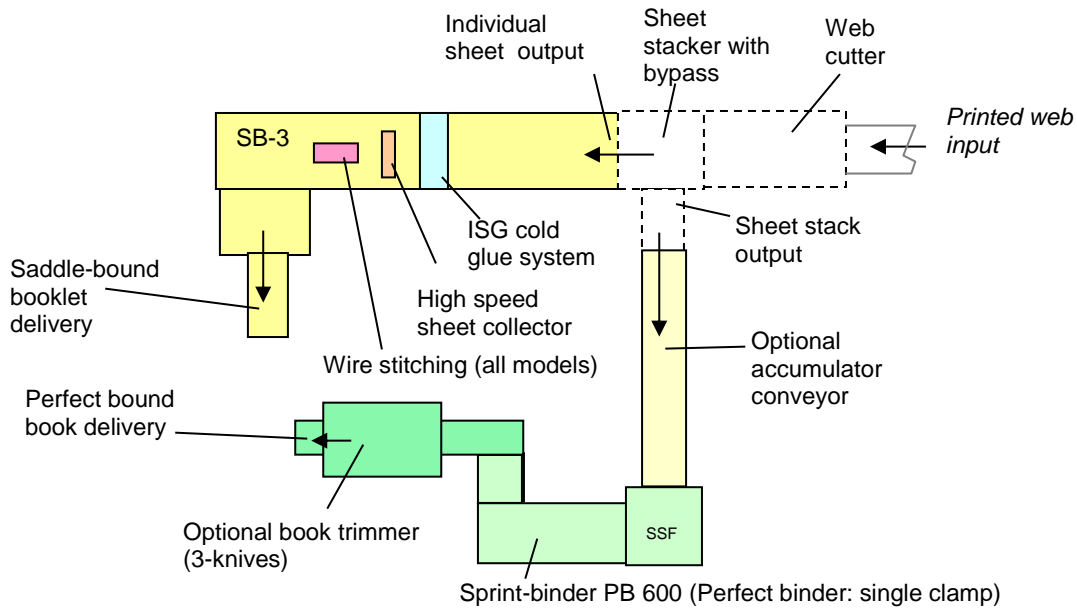
Saddle-stitched books, ISG cold-glued books and 'perfect bound' books with combined cold and hot glue binding.



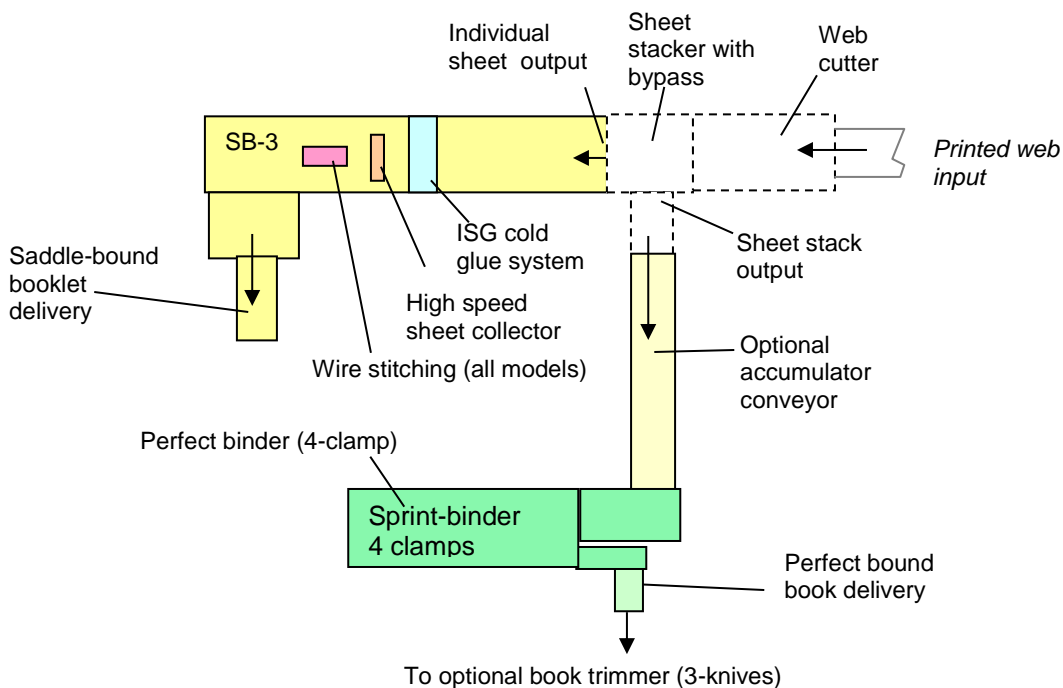
- **Smart-binder SB-4/1200 or 4/2000 (SB-3 with Sprint-binder 4-clamp perfect binder) :** Saddle-stitched books, ISG cold-glued books and 'perfect bound' books with combined cold and hot glue binding.



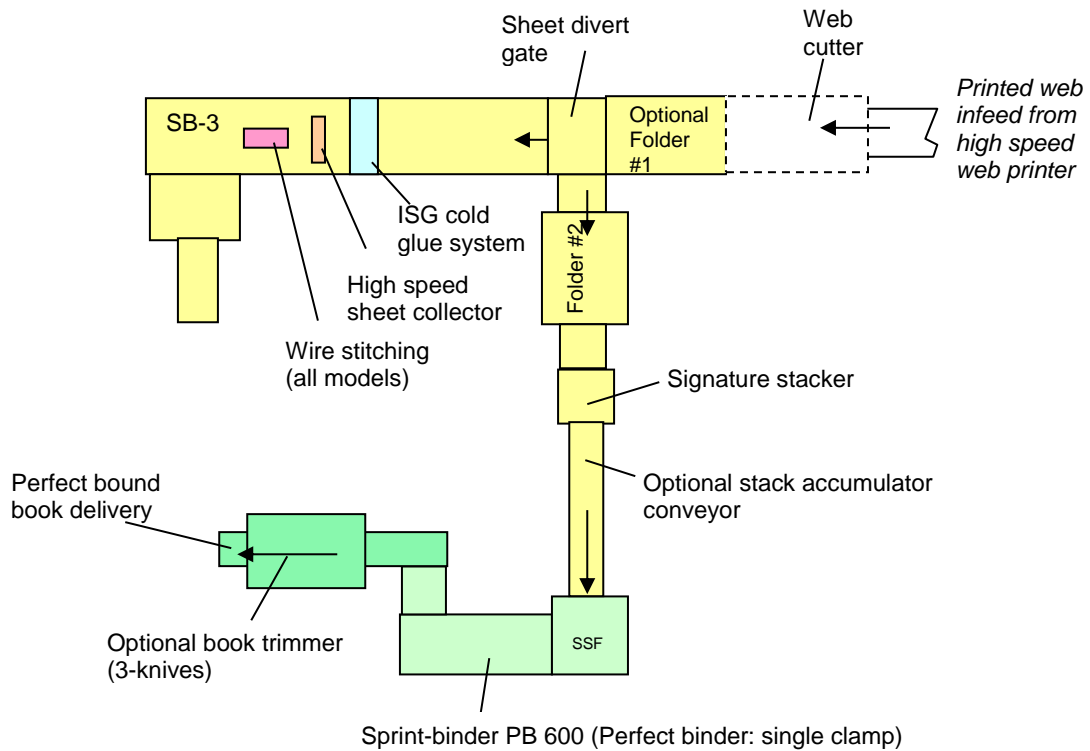
- **Smart-binder SB-5/600 (SB-3 with Sprint-binder PB 600 single-clamp perfect binder):** Saddle-stitched books, ISG cold-glued books and perfect bound books.



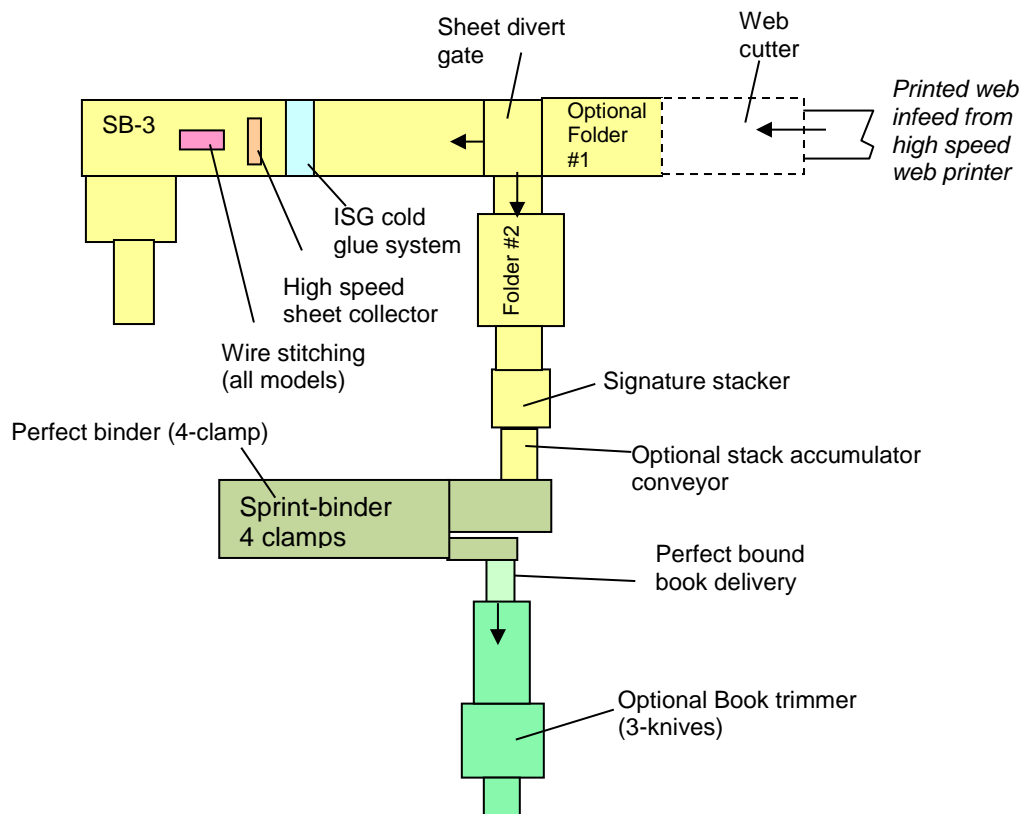
- **Smart-binder SB-5/1200 or 5/2000 (SB-3 with Sprint-binder PB 2000R 4-clamp perfect binder):** Saddle-stitched books, ISG cold-glued books and thick perfect bound books.



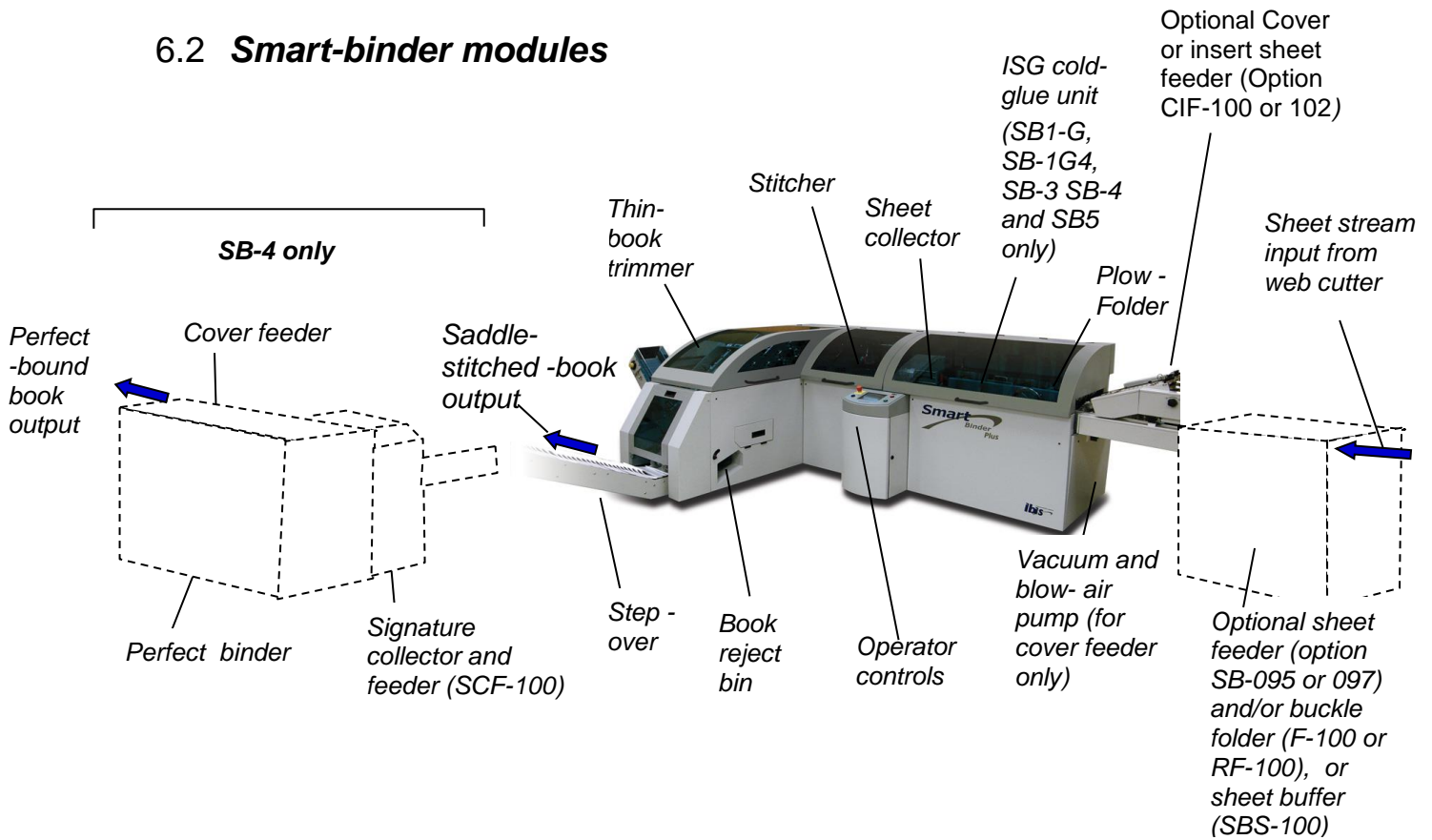
Smart-binder SB-5/600F (SB-3 with Sprint-binder PB-600 single-clamp perfect binder): Saddle-stitched books, ISG cold-glued books and perfect bound books.



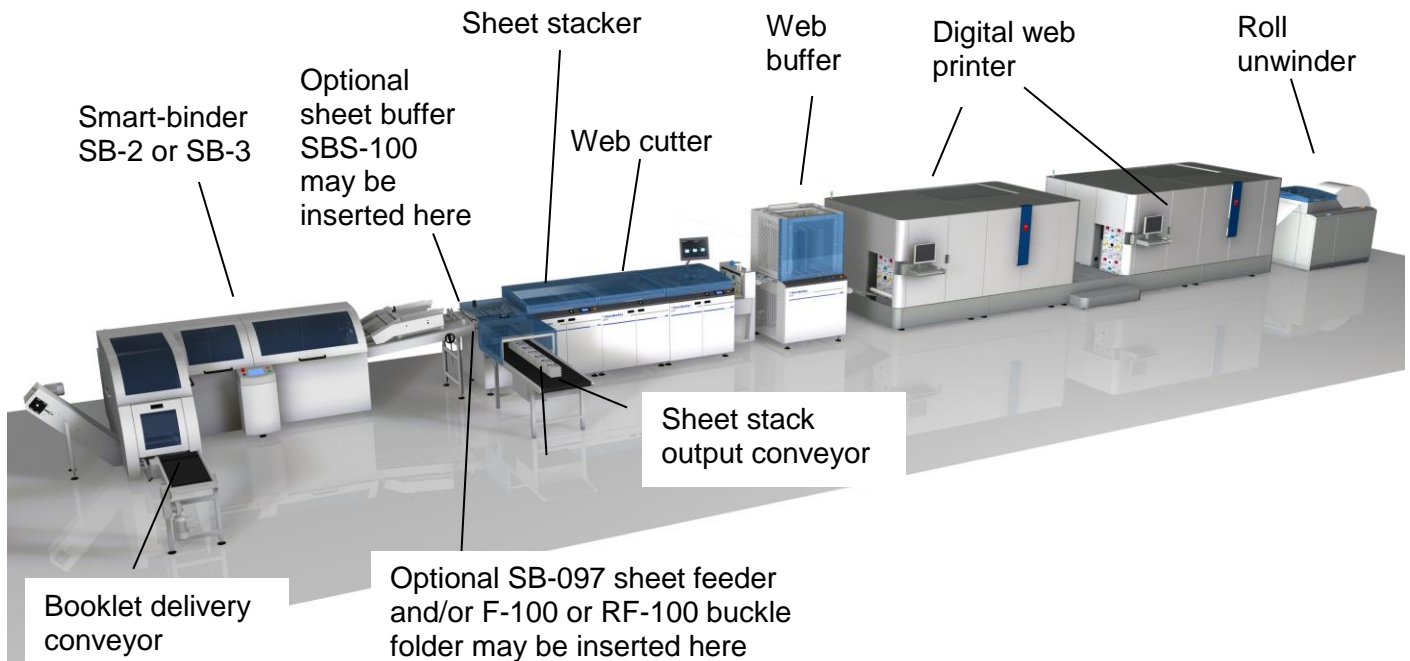
Smart-binder SB-5/1200F or 5/2000F (SB-3 with Sprint-binder PB-2000R 4-clamp perfect binder): Saddle-stitched books, ISG cold-glued books and perfect bound books.



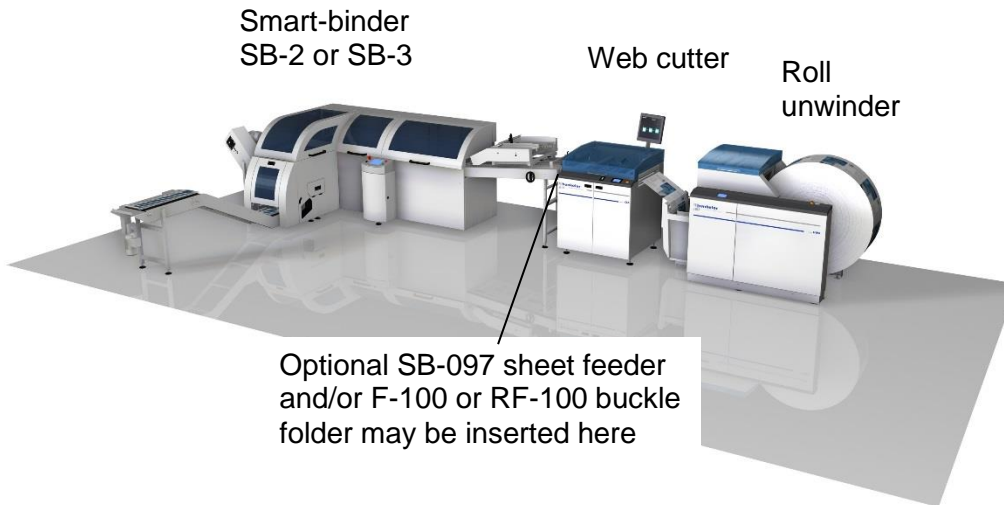
6.2 Smart-binder modules



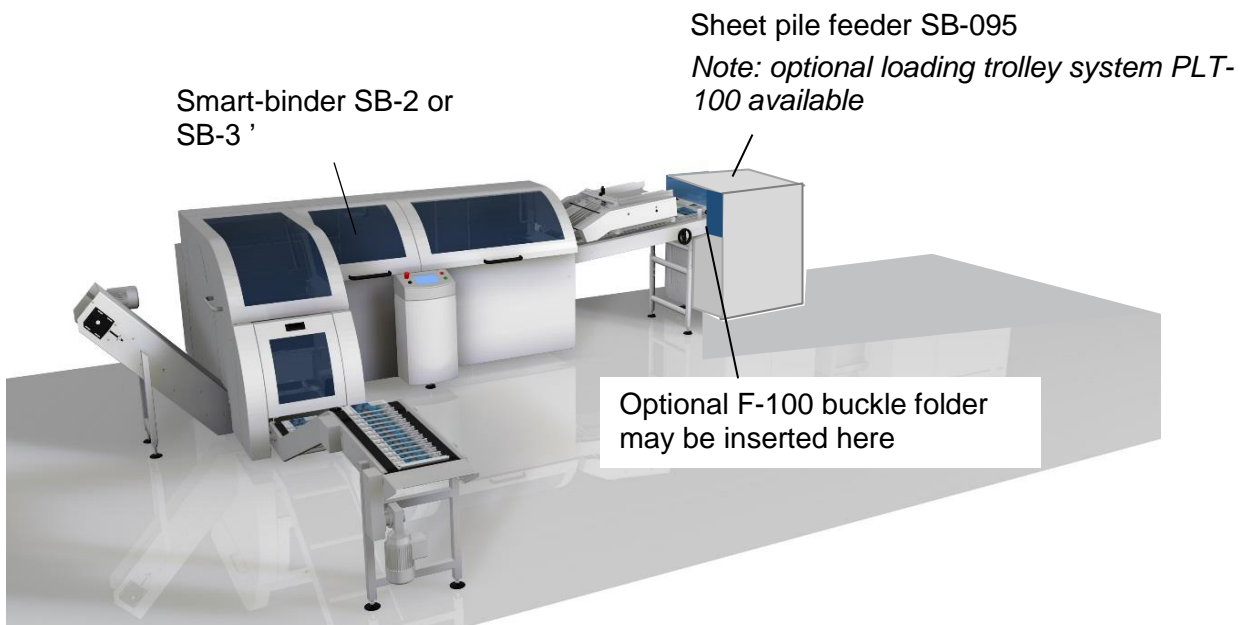
6.3 Smart-binder SB-2, SB-3 or SB-X in-line with a digital web printer



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



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



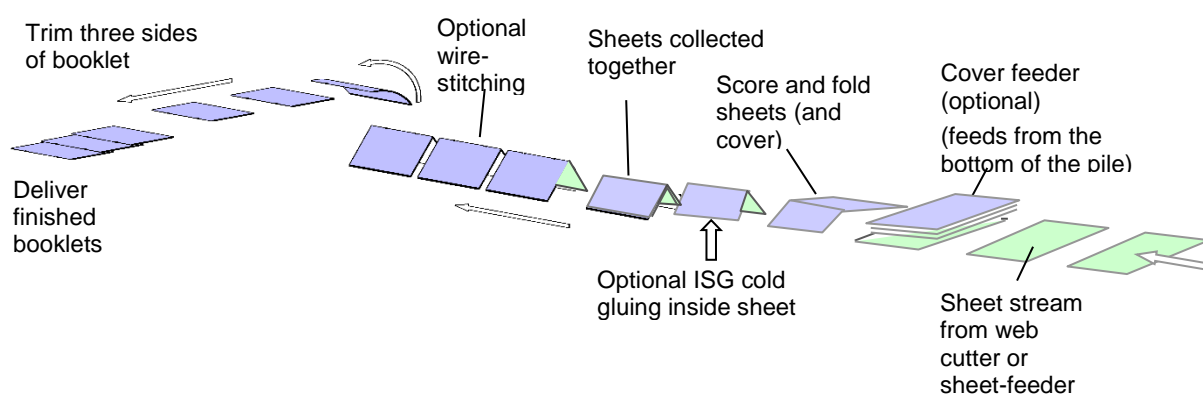
6.6 Smart-binder paper process flow

Producing saddle-bound booklets up to 10mm (0.39") thick

6.6.1.1 Input sheet rates

The Smart-binder can be installed directly in line with printers running at speeds up to 130 metres/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 200 metres/min (656 feet/min). The Smart-binder can also be fed near-line from a roll unwinder /sheeter at up to 150 metres/min (492 feet/min) or 200 metres/min (656 feet/min) with an extra buckle folder.

It may be fed from a sheet pile feeder at up to 500 sheets per minute.



Note: go to http://www.ibis-bindery.com/resources/smart_stitch_glue.swf or http://www.ibis-bindery.com/resources/smart_stitch.swf to view sheet flow 'animations'

6.6.1.2 Accurate high quality folding.

Each sheet inside the book is folded individually and collected together with the book cover to produce wire-stapled or cold-glued booklets.

6.6.1.3 Wire stitched booklets

After the sheets and cover are collected together they pass into the stitching module. Wire stitches are formed from continuous wire feed using stitching 'heads'. Up to four stitching heads can be used to give up to four stitches per book. Loop stitches can be used to produce booklets to fit into standard ring binders.

After stitching the books are three-knife trimmed to finished size. The individual sheet folding and three-side trimming produces books that look and feel like those produced on conventional saddle-stitchers.

Optional 'Dynamic stitching' ASA-100 is available if needed to vary the staple dimensions automatically on-the-run to suit the thickness of the book being stitched.

An optional post-trimmer 'spine squaring' system (SM-100) is available for booklets up to about 4mm maximum thickness.

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

The 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.



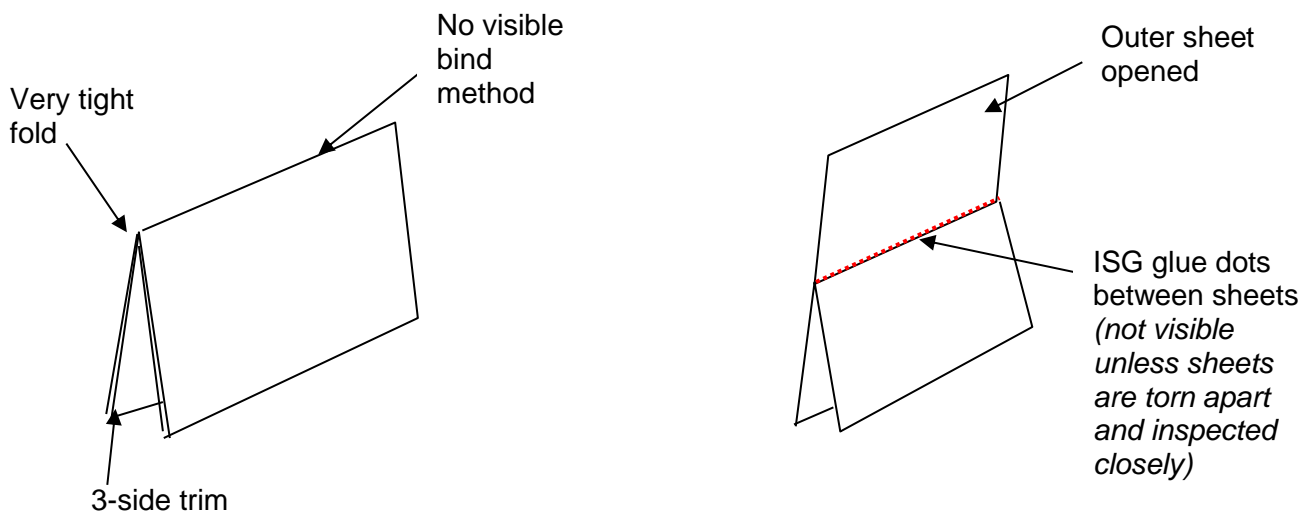
ISG cold-glue nozzle

6.6.1.4.1 Advantages of the ISG process over conventional wire stapling:

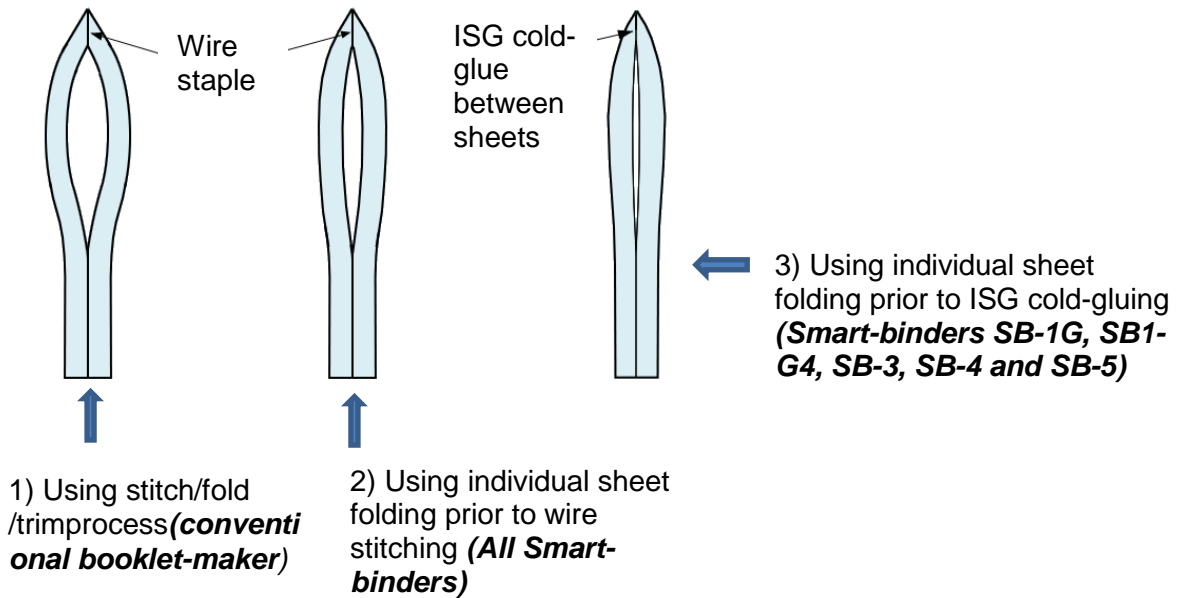
- Higher page pull strength on the outer and inner sheets
- Tighter fold, particularly on thicker books. This is because wire stapling tends to 'open up' the book fold. A tight fold is particularly important when inserting documents into envelopes
- Cold-glued books can be recycled more easily than books 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 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).

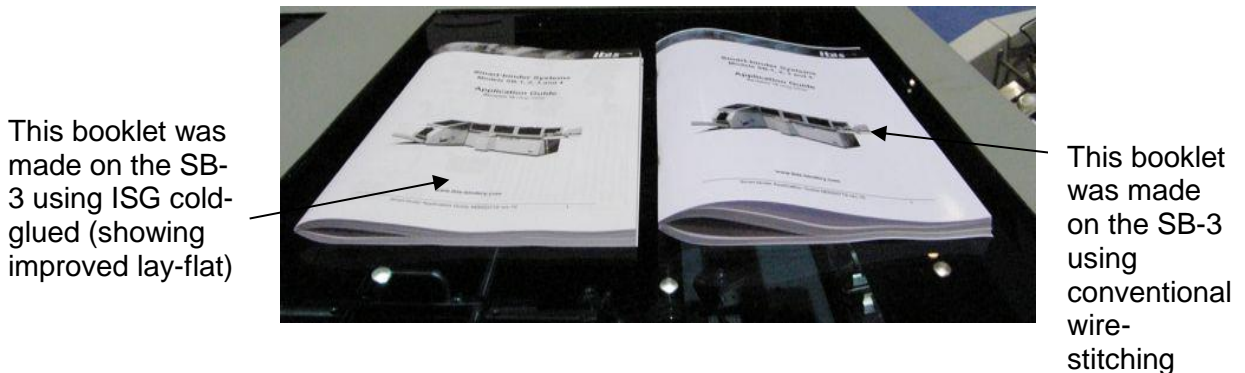
6.6.1.4.2 ISG- Glued booklets



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



6.6.1.5 Quality comparison between wire stitching and ISG cold-gluing

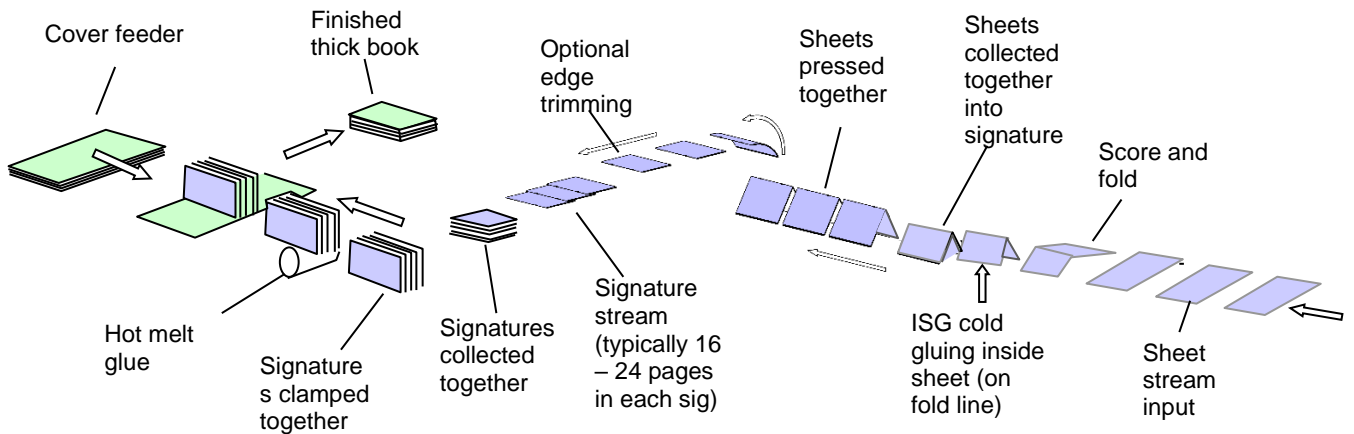


6.6.1.6 Consumable cost comparison between wire stitching and ISG cold-gluing

See 'Consumables' section 10.2.3.2.1

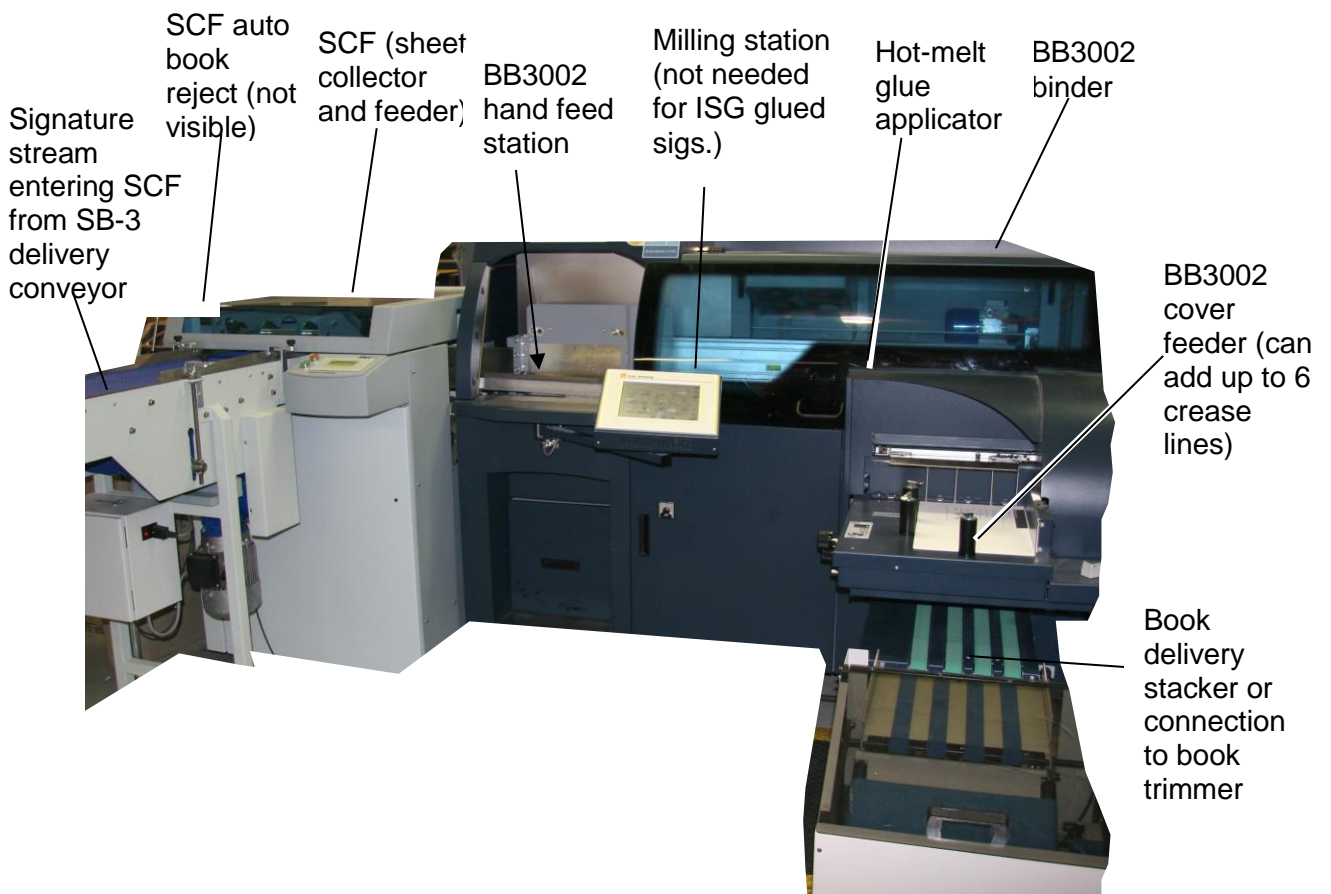
Note: In general ISG cold glue is a similar consumable cost to wire staples when making thin books (lower number of pages/book), but a higher cost when making thick books.

Producing perfect bound books 5-60 mm thick (0.2-2.36") using the SB-4.

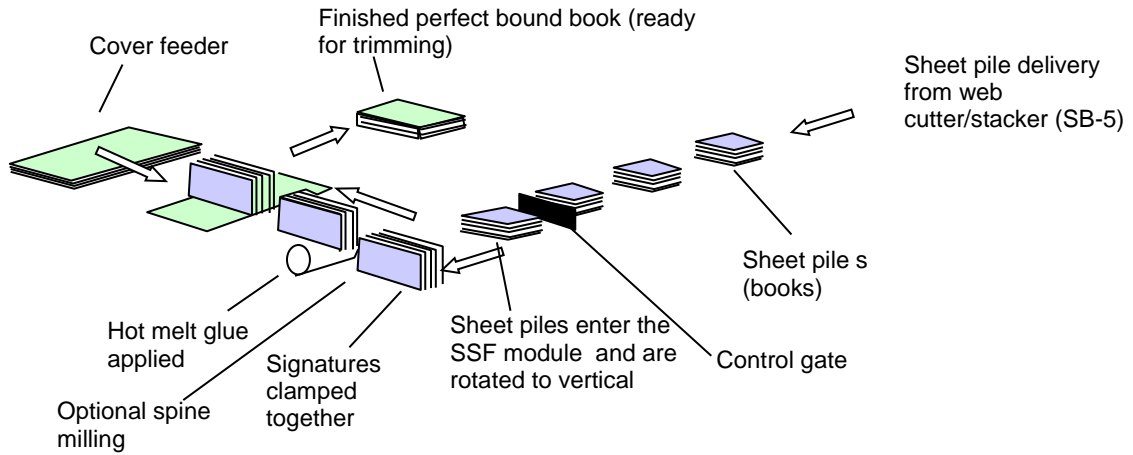


The SB-4 produces thick 'perfect bound' books by producing ISG glued sections ('signatures') containing typically between 16 and 24 pages. These tightly-folded and cold-glued signatures are then collected together into the clamp of the in-line Sprint-binder PB-600 or PB-2000 where a layer of hot-melt glue is applied to the outside of the signature folds and a scored book cover is pressed tightly around the spine. The Sprint-binder adjusts itself automatically to suit incoming book thickness to make the system truly bind-on-demand.

One-clamp perfect binder (model Sprint-binder PB-600B) and SCF as used with the SMART-BINDER model SB-4/600.

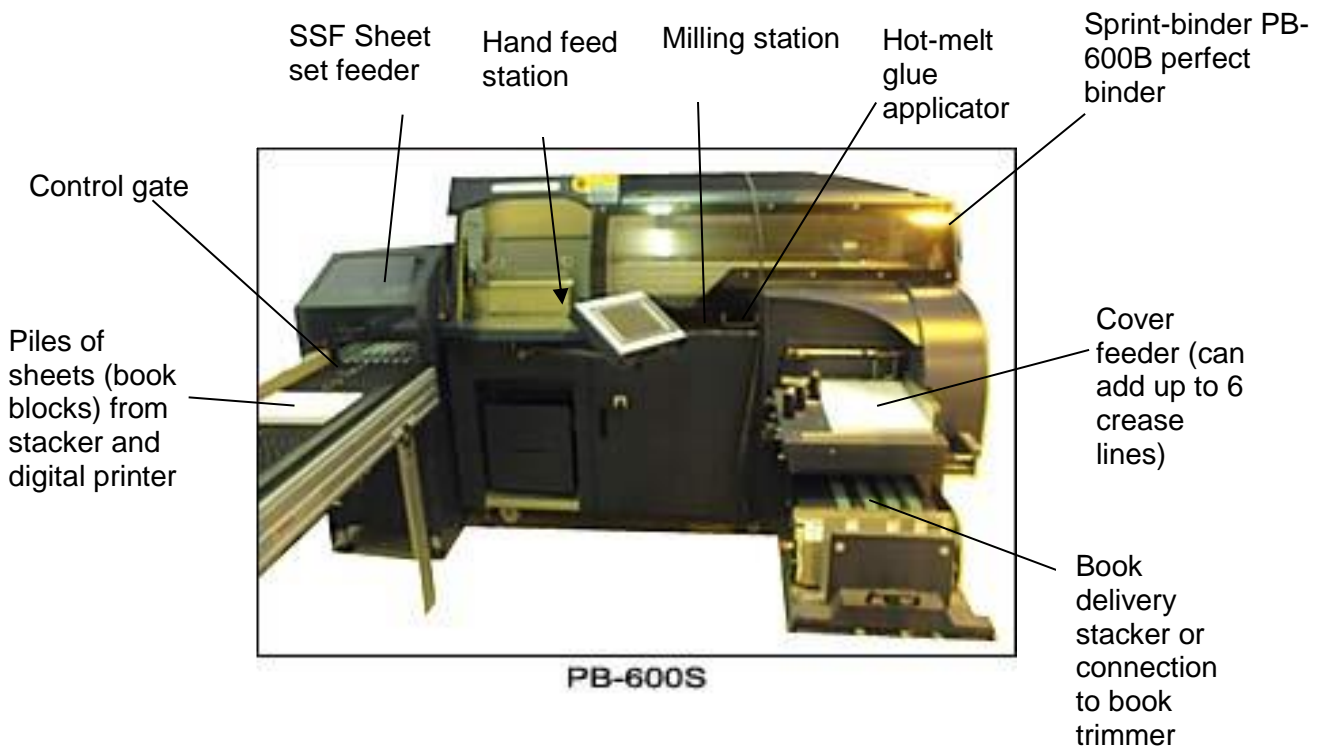


Producing perfect bound books 5-60 mm thick (0.2-2.36") using the SB-5



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.

Single-clamp perfect binder (model Sprint-binder PB-600B) as used on the SMART-BINDER model SB-5/600



Single-clamp perfect binder (model Sprint-binder PB-600R) as used on the SMART-BINDER model SB-5/600R



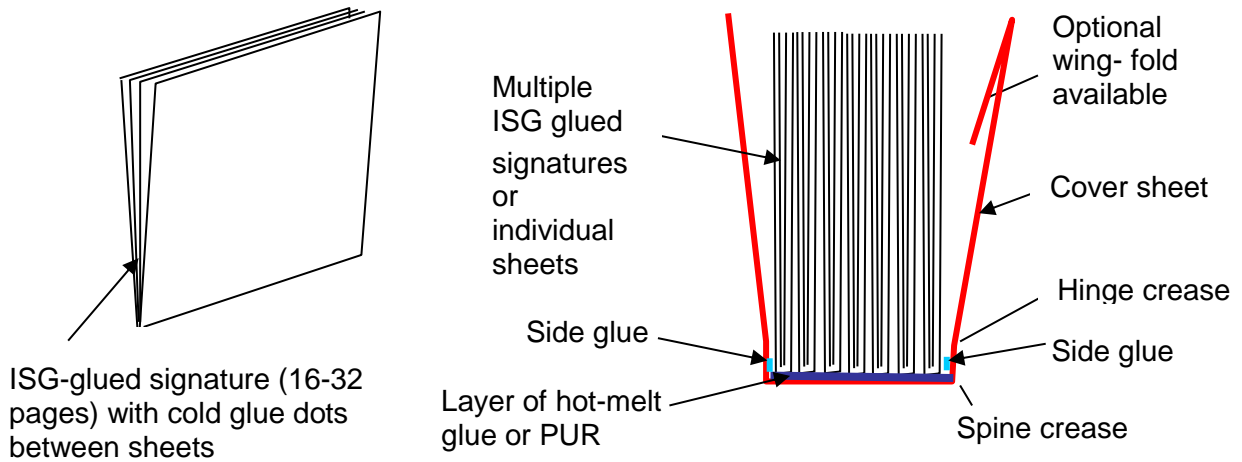
4-clamp perfect binder (model Sprint-binder PB-1200R) as may be used on the SMART-BINDER model SB-4/1200R and SB-5/1200R



Sprint-binder operation

The Sprint-binder (perfect binders) use two glue applicator rollers and a reverse spinner roller to accurately control the EVA 'hot-melt' glue layer. Alternatively 'nozzle' 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.



The cover feeder applies multiple crease lines to each cover to assist it to bend around the book and to open easily (including optional 'gate-fold' or 'wing-fold' creasing). A creasing-knife is used, instead of scoring wheels, which reduces cracking of color toner printed covers. 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 using the automated feeder options, or may be loaded into the clamp by hand.

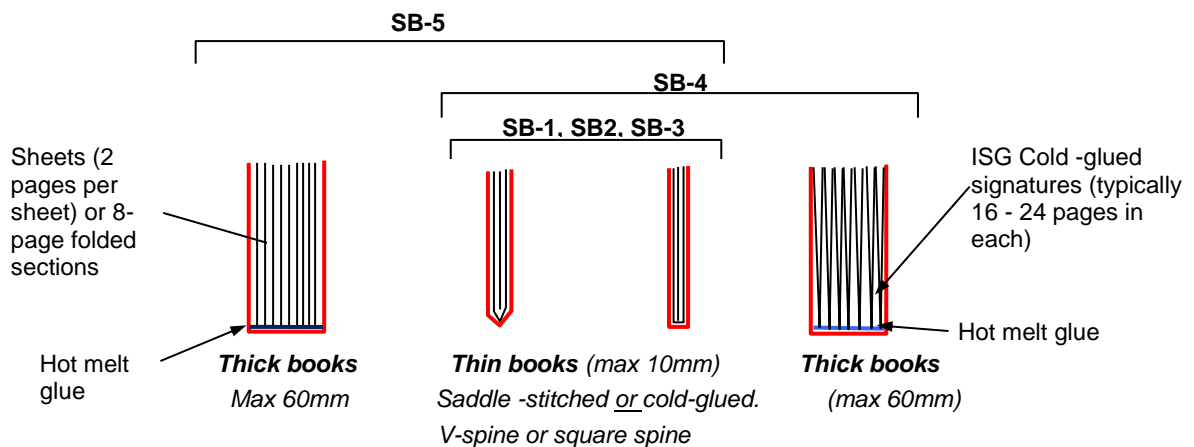
Optional book trimmer

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 (such as the TR-30S or DT-30) are available allows for books up to 60mm (2.36") thick.

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



6.7 Book output: binding options



6.8 Feeding Covers and Insert Sheets (saddle-bound books only)

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 cover pile height from 20mm to 200mm. Other options include a additional feeder (CIF-101) for extra insert sheets or covers. 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 **section 6.22** for further more detailed information on cover and insert feeding.



Note that when ISG gluing, 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.

6.9 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 about 60 pages.. unless the optional ASA-100 automatic stitch adjustment system is selected).

Note that if some booklets contain fewer than 4 sheets, and these are mixed together 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).

When producing personalised books in off-line mode (using the sheet pile feeder SB-095) then the sheet bar code reader may be positioned to read the top sheet in the pile. 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.

6.10 **Producing personalised (varying thickness) perfect -bound booklets with (optional) matching covers.**

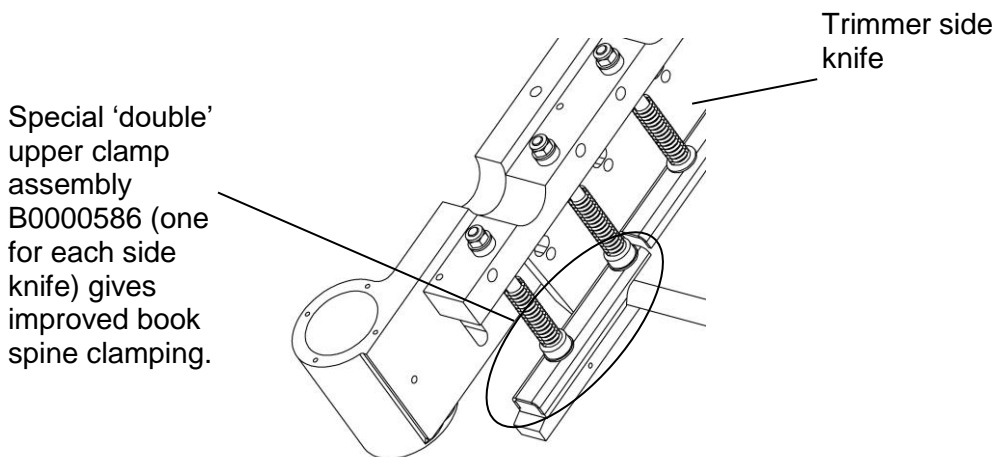
The Smart-binder models SB-4/600 and SB-5/600 use the Sprint-binder PB-600 1-clamp perfect binder which allows for personalised 'perfect-bound' books (with varying thickness) to be produced up to 60mm thick. If using the PB-600B binder then this facility is provided by the SCF-100 code reader which reads a code on each incoming signature. It then gives a signal to the perfect binder (to which it is connected) to adjust its clamp, side gluing and cover pressing station to suit the next book thickness (*note: some extra seconds are required by the binder to adjust for a different thickness book which reduces the maximum cycling rate*). An optional extra code reading system is available (refer to IBIS for details) to ensure the cover in the PB-600 cover feeder matches the inside book block, if required.

The Smart-binder SB-5/600 (with PB-600 1-clamp perfect binder) 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-5/600 may alternatively process printed sheets into folded signatures and can vary book thickness by changing the number of signatures in each book under bar code control.

6.11 **Producing thick saddle-bound booklets (in the range 5-10mm)**

The Smart-binder is able to produce booklets up to 10mm thick. The maximum thickness is 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 exceed 6-7mm book thickness due to the extra bulk of the head-folds,

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). 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.



6.12 **Book and sheet integrity checking**

The Smart-binder control system tracks each sheet and each saddle-bound book (or signature) using the information from the barcode to ensure that only books with the correct pages are produced. Any "bad" books are automatically rejected. 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

on the Smart-binder delivery may require to be reprinted and this re-print signal may be provided by the Smart-binder controller.

6.13 *Three-knife trimming*

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).

A separate thick-book 3-knife trimmer for perfect bound books (for example the CMT-130, CMT-330 or TR-30S trimmer) 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.

6.14 *Optional equipment*

Optional modules which may be supplied with the Smart-binder

Part no.	Description	Function	For more info see section...
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	6.15.1 11.4 item N
SB-096	Sheet pile feeder mounted <u>on the side</u> (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.	6.15.2 11.5 Items N and O
SB-097	Sheet pile feeder mounted <u>in-line</u> (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 (<i>combined in-line and off-line operation</i>).	6.15.13
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 conveyor in order to allow web speeds in excess of 130 metres/min using 8-page sheets, or to run paper stock weights below 60gsm. The F-200 is a more expensive 'selective' folder which can vary on the run between producing 8 and 12 page signatures.	6.18.1 6.18.2
RF-100	Rotator/folder	The RF-100 may be used directly before the Smart-binder infeed register conveyor in order to rotate and fold sheets (<i>for production of small format books from large 8-page sheets</i>).	6.18.3

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.	Refer to IBIS
RRT-100	Roller table	May be used to move sheets sideways before entering the Smart-binder infeed <i>(in case they do not arrive from the upstream equipment central with the Smart-binder)</i>	
RRT-105	Sheet rotator (based on roller table) for sheets up to A3+ size	May be used to rotate sheets by 90 degrees before entry to the Smart-binder. For slower speed applications only (normal for use only with the SB-1)	
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 (116 sheets/min)	6.22
CIF-101	Additional cover or Insert sheet feeder	Additional insert or sheet feeder (includes extra sheet conveyor below)	6.22
CAL-101	Cover Autoloader for use with CIF-102 or CIF-101	Increases max cover pile height from 20 to 200mm	6.22
DMP-100	Dynamic Micro-perforator system with <u>2 perf heads</u>	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	6.23
DMP-101	Dynamic Micro-perforator system with <u>4 perf heads</u>	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.	6.23
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 <i>Max book thickness: 4 mm</i>	Refer to IBIS
CHP-100	Corner Hole punch	May be installed inside the Smart-binder trimmer to add a punched hole in the corner of each booklet <i>Max book thickness: 4 mm</i>	Refer to IBIS
HDM-101	Hole drilling module	May be installed at the end of the Smart-binder delivery to add drilled holes to the finished book. <i>Max book thickness : 50mm</i>	Refer to IBIS

BSS-11	Book stacker module	May be installed at the end of the Smart-binder delivery to create completed book stacks (piles) or stacks of signatures for feed into the perfect binder. <i>Refer to IBIS for further details.</i>	6.24
SBCR-100	Intelligent stacking options for BSS-11 stacker	Includes bar code reader and separate controller	
ISG-100	ISG cold glue system	ISG cold glue module (requires high pressure air). May be used to upgrade SB-2 to SB-3 (or SB-1 to SB-1G)	6.6.1.4
SCF-100	Signature collector and feeder	Collects signatures together under bar code control and delivers them into the clamp of the PB-600B binder (<i>used if the PB-600B is selected as parts of the in-line SB-4 system</i>)	6.6.3 11.6 item N
PB-600B binder	Perfect binder with cover feeder (400 bks/hr)	Use to make perfect-bound books at up to 400 bks/hr (<i>single shift work</i>). <i>May be auto - fed from the SCF or SSF for in-line operation</i>	6.6.3
PB-600R binder	Perfect binder with cover feeder (400 bks/hr)	Use to make perfect-bound books at up to 600 bks/hr (<i>may be auto - fed for in-line operation</i>)	6.6.6
PB-1200R	Perfect binder (4 clamps) and cover feeder (1200 books/hr)	Use to make perfect -bound books up to 60 mm thick at up to 1200 books/hr (<i>may be auto- fed for in-line operation</i>)	6.6.7
CMT-130	CMT130 3-side trimmer	Use for final trim of perfect bound books up to 51mm thick (<i>may be used off-line or in-line with the binder</i>)	6.6.9
CMT-330	CMT330 3-side trimmer	Use for final trim of perfect bound books up to 51mm thick (<i>may be used off-line or in-line with the binder</i>)	6.6.9
TR-30S	TR30S 3-side trimmer	Heavier duty trimmer for final trim of perfect bound books up to 60mm thick (<i>may be used off-line or in-line with the binder</i>)	Refer to IBIS
SM-100	Spine squaring module	May be fitted directly to end of Smart-binder delivery conveyor in order to press the spine into a 'square' shape. Only for books up to about 3mm thick. Max speed 1400 books/hr.	6.25
DES-100	Document edge sealer	May be fitted directly to end of Smart-binder delivery in order to glue the edges of the over-size cover together. Used to secure 'sensitive/confidential' documents such as exam papers.	Refer to IBIS
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	6.29

		with thicker booklets to be produced without slowing down the printer)	
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Ancillary features which may be fitted to the Smart-binder.

Part no.	Description	Function	For more info see section.
APP-100	Air compressor	May be used for air supply to ISG cold glue system and/or BB3002 binder (normally high pressure air is customer-supplied so this compressor is not needed).	
BCR-105	'CCD' Bar-code reader for the cover feeder	May be used to match bar codes on covers with bar codes on sheets	
DCR-101	2D Datamatrix reader for the cover feeder	May be used to match bar codes on covers with bar codes on sheets	
FGS-100	Folder glue system	Used to apply a line of ISG cold-glue inside the F-100, F-101 or RF-100 folders.	6.18
TFR-100	Voltage transformer for main power supply	For use when the factory supply voltage is outside the 380 – 415 range (e.g. for installations outside Europe)	Refer to IBIS
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). <i>The 43/6S may be used for books up to 7mm thickness</i>	6.20.1
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. <i>(recommended to be ordered with each new machine)</i> <i>The 43/6S may be used for books up to 7mm thickness</i>	6.20.1
SST-105	Standard Hohner 52/8 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) <i>The 52/8 may be used for books up to 10mm thickness</i>	6.20.1
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. <i>(recommended to be ordered with each new machine)</i> <i>The 52/8 may be used for books up to 10mm thickness</i>	6.20.1
LST-100	Loop stitch head	May be used to replace <u>standard</u> stitch head in order to produce loop stitches	6.20.2 10.1.3.5
LSM-100	Loop stitch drive modification	Stitcher drive upgrade needed when using loop stitch heads	6.20.4 10.1.3.5
SDI-100	Stitcher drive automatic inhibit system	May be used to automatically inhibit stitching (for example if producing single 4-page folded sheets).	6.20.5

HKS-100	Two 100Kg wire spool holders and spools (floor mounted)	May be used instead of normal 2.5Kg wire spools. Recommended for long run applications and to reduce wire pull force needed.	6.20.6
WST-100	Handling trolley for 100 Kg wire spools (includes hydraulic lifting jack)	Used in conjunction with HKS-100 (above)	6.20.6
CKN-100	Trimmer center knife assembly with ¼" wide trim-out knife	Use to make small format booklets: 2-up production. Max book thickness approx 3mm (1/8")	6.16
CKN-101	Trimmer center knife assembly with 3/8" wide trim-out knife	Use to make small format booklets: 2-up production. Max book thickness approx 4 - 5mm (3/16")	6.16
CKN-102	Trimmer center knife assembly with single bladed knife (no trim-out)	Use to make small format booklets: 2-up production. Max book thickness approx 6-7mm (1/4")	6.16
TWC-100	Trimmer waste removal conveyer	Used to remove trimmed-off paper if no pneumatic waste extraction system is available.	6.17 + 11.3 item H
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.	6.26
B000 0586	Trimmer clamp assembly for very thick books	May be used to reduce spine 'corner-tearing' when making thick books.	6.11
TWB-100	Trimmer waste collection bin	Use to collect trim-off paper from waste removal conveyer TWC-100.	6.17
TCC-100	Trimmer waste chute	Use instead of TWC-100 to connect trimmer to customer-supplied vacuum paper waste extraction system.	6.17
BDC-100	90 degree bend conveyer	Puts book delivery conveyer at 90 degs to reduce overall machine width	11.13
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).	
SPK-100	Essential Smart-binder spare parts kit	Includes all parts that <u>must</u> be held close to the machine to support normal operation. <i>Refer to IBIS for spare parts relating to optional modules.</i>	10.2.1
SPK-101	Basic Smart-binder Spare Parts Kit	Includes all parts recommended to be held close to the machine. <i>Refer to IBIS for spare parts relating to optional modules.</i>	10.2.1
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. <i>Refer to IBIS for spare parts relating to optional modules</i>	10.2.1
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 (<i>one ready to fit and one being reground</i>).	10.2.3.3

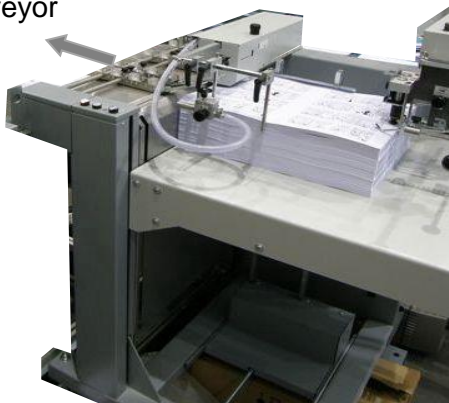
SCK-101	Spare set of trimmer center-knives(1/4" trim out)	It is recommended to hold two spare sets of knives for each machine (<i>one ready to fit and one being reground</i>)	9.2.3.4
SB-092	Infeed extension for Smart-binder interface to 'reciprocating' web cutters	Only needed when interfacing to reciprocating web cutters/sheeters (not required for normal rotary sheeters)	Refer to IBIS
SMK-100	Scheduled maintenance kit	All parts that are required to be changed at regular intervals (every 3000 running hours)	10.2.2
SMP-100	Scheduled Maintenance Programme SMP	Chose this option for all scheduled maintenance to be carried out by IBIS.	10.2.2
CSP-100	Customer support program CSP	Chose this option for enhanced support program from IBIS, UK.	10.2.2

6.15 Feeding sheets off-line from a pile feeder

SB-095 Direct-connected pile feeder (for Smart-binder off-line operation only)

The direct-connected pile feeder (Option SB-095) is available to allow dedicated off-line operation. The feeder may be loaded with piles of pre-collated sheets and an optional loading trolley system (PLT-100.. see section 6.26) is available to assist loading. The maximum pile height is approx 700mm, but actual pile heights will depend on a number of factors including the amount of toner used (the top sheet must remain relatively flat).

Connection to Smart-binder infeed conveyor



The Smart-binder must be stopped to reload the pile. Allow about 3 mins to reload without using the optional loading trolley (option PLT -100), or approx 35 secs min if using the loading trolley.

Each sheet should have a bar code printed on the upper side (refer to section 9.2). The permissible bar code locations on the sheet are shown in section 9.2.

SB-096 Pile feeder on the side, with roller table to change sheet direction

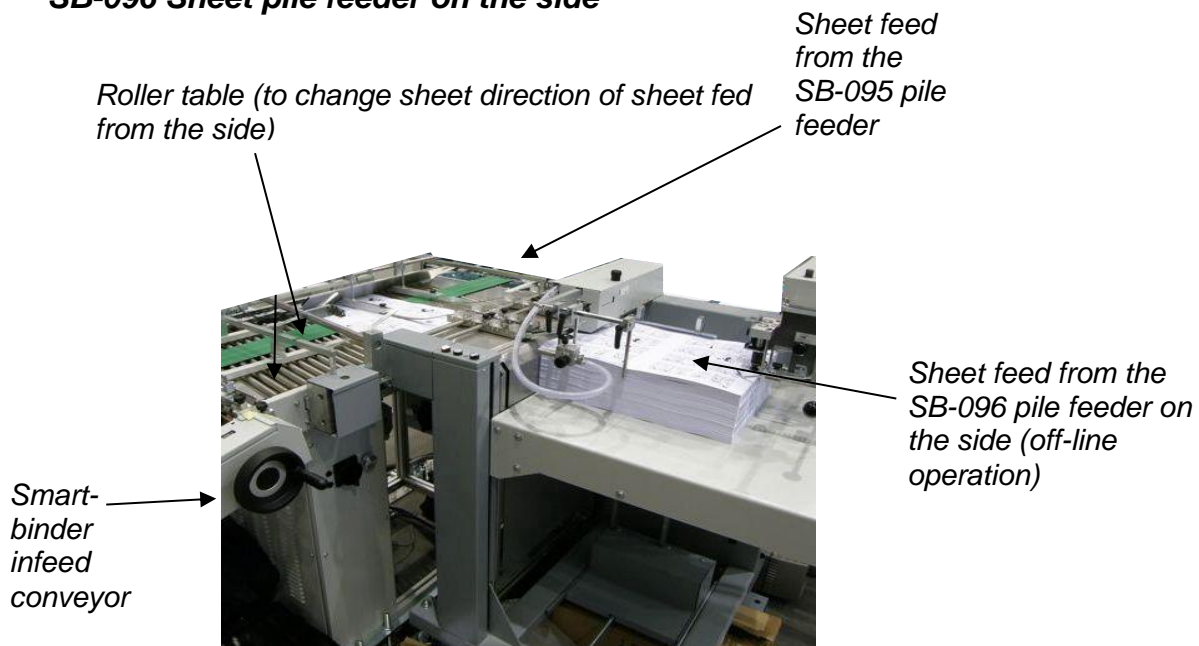
The pile feeder and roller table (Option SB-096) is available if it is required to fit an additional sheet pile feeder to an off-line Smart-binder. The roller table allows sheets to enter from either the end (from the SB-095 feeder) or from the side (from the SB-096 feeder). The roller table will change the direction of sheets fed from the side, but sheet weight must normally be greater than 60 gsm (41 lb offset) when changing direction.

The feeder may be loaded with piles of pre-collated sheets and an optional loading trolley system (PLT-100) is available to assist loading. The maximum pile height is approx 700mm, but actual pile heights will depend on a number of factors including the amount of toner used (the top sheet must remain relatively flat).

The machine must be stopped to reload the pile (allow about 3 mins to reload without the optional loading trolley PLT-100, or approx 35 secs if using the loading trolley).

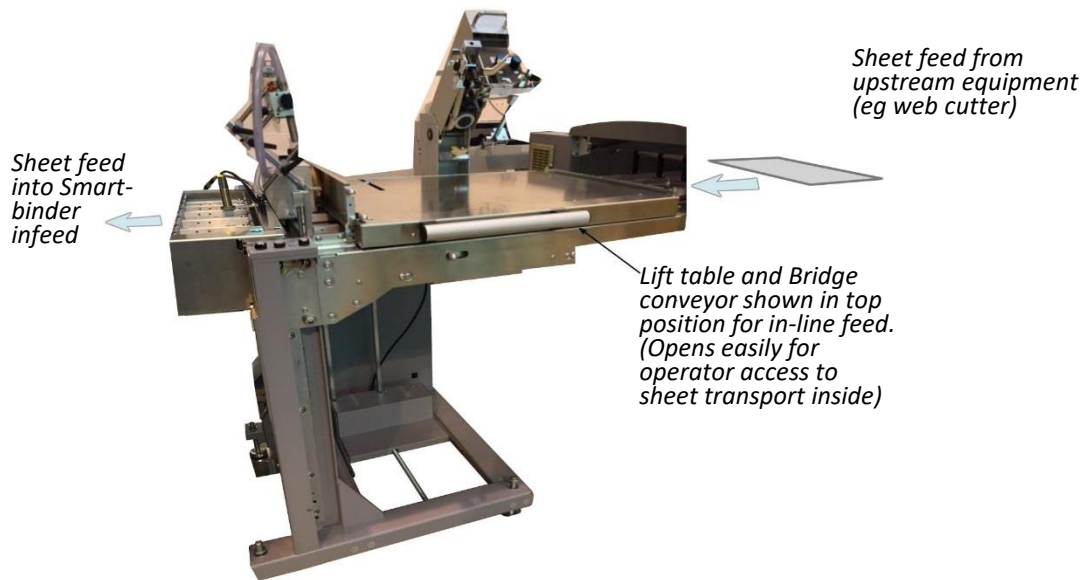
Each sheet fed from the SB-096 pile feeder should have a code printed on the edge (refer to section 9.2)

SB-096 Sheet pile feeder on the side



SB-097 In-line Sheet Pile-feeder with removable bridge conveyor for Smart-binder combined off-line and in-line operation

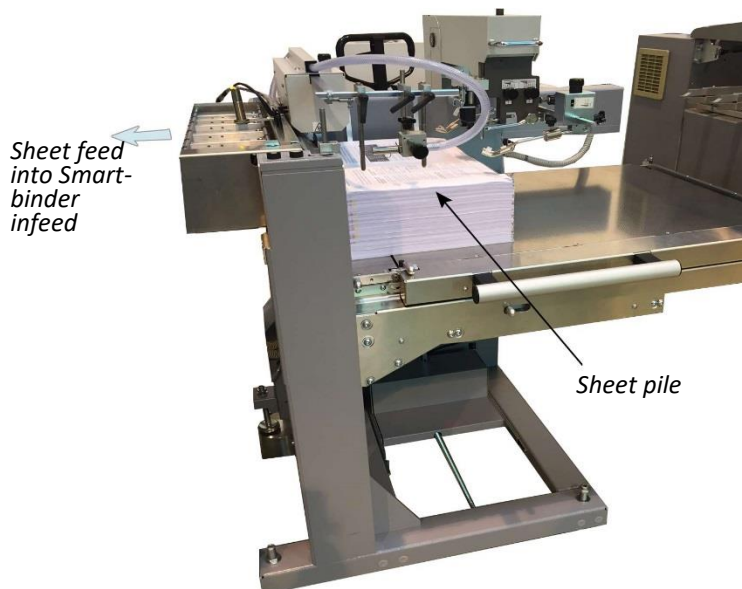
The pile feeder system (option SB-097) is available to allow a Smart-binder which is fed from a web cutter to also be fed off-line from a sheet feeder



To run in-line, the 'Lift Table and Bridge conveyor' is raised to its highest position, as shown above.

The bridge conveyor then transports sheets from the upstream web cutter through the sheet feeder to the Smart-binder infeed.

When running 'off-line' the 'lift table and bridge conveyor' is lowered and sheets are loaded on top of 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 of up to 400-500 sheets/min.



The changeover time 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 2-D Datamatrix code, printed on it to allow the Smart-binder to control booklet integrity.

The length of the SB-097 feeder is 1230mm.

A video of the SB-097 can be seen at <http://www.ibis-bindery.com/ibis-video-sb-097-2.htm>

6.16 Trimmer Center- Knife (Options CKN-100, 101 and 102)

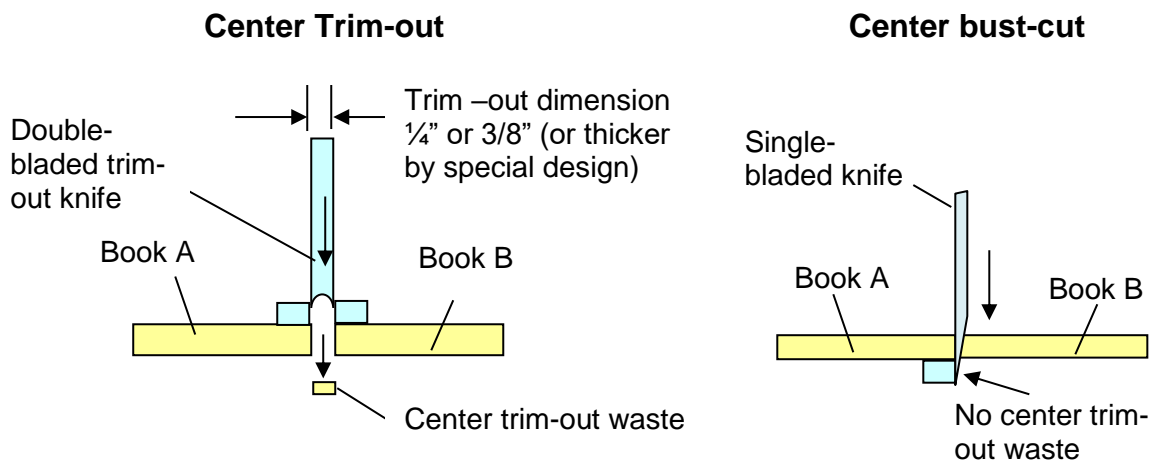
The optional trimmer center-knife system for the Smart-binder saddle-binder trimmer may be used to produce saddle-bound booklet sizes, which are less than 160mm (6 1/4") spine length (e.g.: A5 landscape or 8 1/2 x 5 1/2" oblong). Each sheet is printed with 8 pages instead of the normal 4 pages. These 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

- 0mm single blade 'bust' cut with no trim-out (CKN-102).
- 6.35mm (1/4") (CKN-100).
- 9.52mm (3/8") (CKN-101).

Options CKN-100 and CKN-101 trim 6.35mm (1/4") or 9.52mm (3/8") out of the middle of the book. Book thickness is limited to 3mm (1/8") for the 6.35mm (1/4") knife and 4.5mm (3/16") for the 9.525mm (3/8") knife.

Thicker books may be produced when using the single knife center-split (CKN-102) instead of a double-edged 'trim-out' knife.



6.17 Smart-binder waste removal (for saddle-bound booklets)

Cut-off waste from the trimmer may be removed by the optional TWC-100 waste removal conveyor. This collects the waste trim-off paper strips for both the front knife and the side knives (and optional center-knife) and delivers these waste strips out of the side of the machine up to a height of 940 mm.

Trimmer waste 'strips' being delivered into collection bin

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

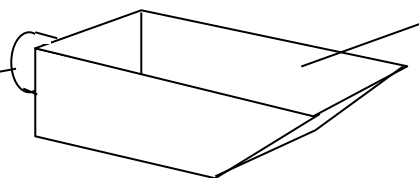


TWC-100
Optional
waste
removal
conveyor

The paper waste drops into a bin which can either be supplied by IBIS (option TWB-100) or (more normally) supplied by the customer. The recommended dimensions of this collection bin are approx L: 1000mm (39") W: 750mm (29.5") H: 600mm (23.5").

However, the preferred way to remove trimmed off paper strips from the Smart-binder is to connect to the customer's **centralised vacuum waste extraction system** for which IBIS can provide a connection chute option TCC-100 (part B0001944) with a 100mm diameter circular outlet, if required.

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



Option TCC-100 waste collection chute (fits inside Smart-binder trimmer)

6.18 **Additional Sheet Folding**

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

Sheet Folder option F-100 or F-101

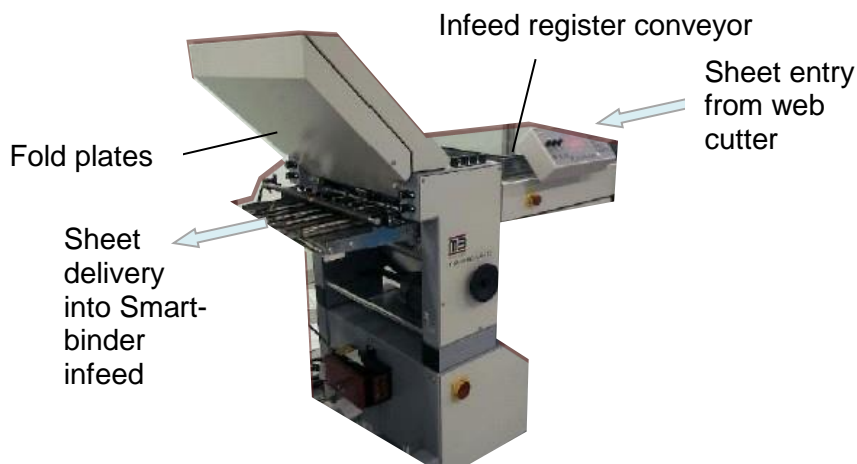
The folders F-100 (made by MB) or F-101 (made by MBO) are conventional buckle folders that can be used to put a cross-fold (buckle-fold) along the middle of each sheet. This enables the web speed to be increased above 130 metres/min (up to about 180 m/min maximum). The folder may be changed to non-fold mode for sheets which do not need folding.

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

This picture (below) shows the F-101 (MBO) folder located in-between the web cutter and the Smart-binder infeed:



This picture (below) shows the F-100 (MB) folder:



Note: When using ISG gluing together with a sheet folder 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.

Selective folder option F-200

The optional F-200 selective folder may be used to increase the maximum web speed from 130 m/min to approx **180 m/min** when using the in-line Smart-binder, 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).

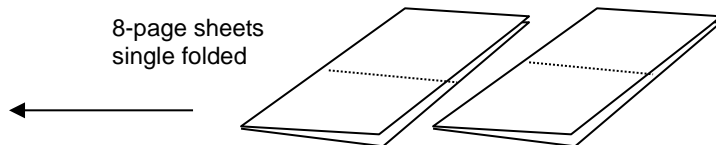
When using the F-200, then sheets are printed to contain either 8 or 12 pages (either 4 pages on each side or 6 pages on each side). These sheets are then (buckle) folded either once, or twice, by the F-200 before they enter the SB and are (plow) folded again in the opposite direction by the SB plough folder.

For example: to produce **A4 books**, sheet are printed and cut to either approx 618mm long or 927mm long. These sheets enter the F200 short-edge leading. The 618mm sheet is cross

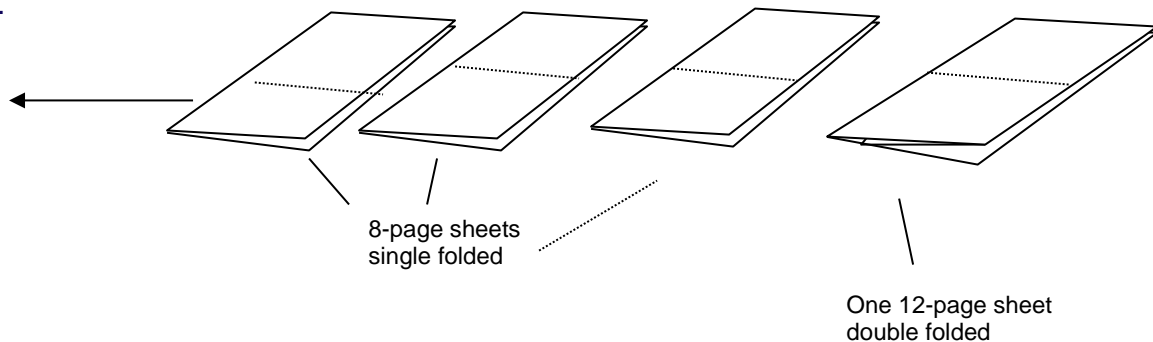
folded once to give a 309mm folded section. The 927mm sheet is cross-folded twice to give a 309mm folded section. These folded sections then enter the Smart-binder, and are processed normally thereafter into finished A4 books. If the number of pages in the book is divisible by 8 then all sections may 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.

6.18.1.1 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:

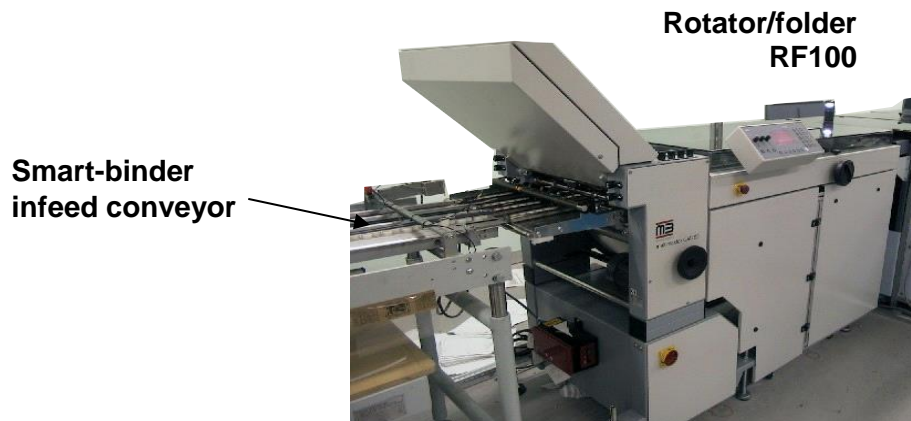


Notes:

- Folded sections are more bulky than flat sheets, so this technique will reduce the maximum number of pages in the book.
- The folding process may be deactivated if it is required to pass sheets through the F-200 without folding.
- The F-200 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 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

RF-100 Sheet rotator and folder

The optional RF100 “rotator folder” may be used to produce small format books in-line with a web printer. This allows the full printer width to be used, rather than having to change to a ‘narrow’ paper web.

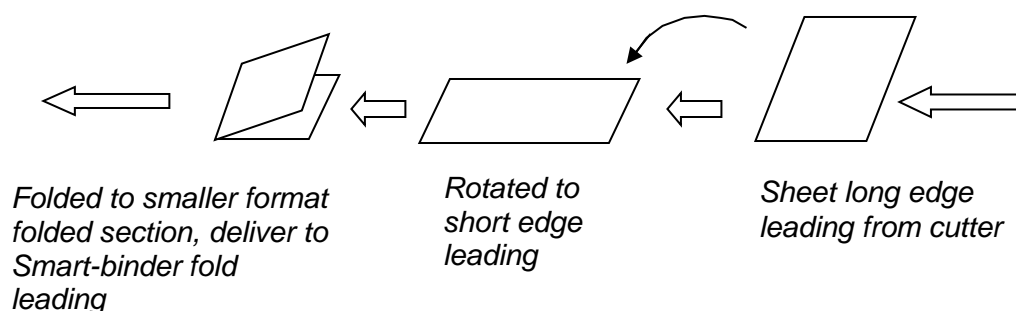


For example: to produce A5 (Digest size – 5.5” x 8.5”) books, print oversize A3 sheets (oversize 17” x 11”). These sheets will be delivered long-edge leading. The rotator folder then rotates each sheet by 90 degrees to short-edge leading. Each sheet is then folded in half to give an oversize A4 (oversize 8.5” x 11”) 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, 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 may also reduce the maximum number of pages in the book.

The maximum printer web speed when using the RF-100 is approx 100m/min (328 ft/min) and the maximum printer web width is approx 457mm (18”).

Sheet flow through “Rotator/Folder”



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 (approx) 250 sheets/min.

6.19 **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 50gsm (34 lbs offset) is approximately the normal minimum for 4-page sheets that enter the Smart-binder, without any pre-fold.

Stock weights as low as about 40 gsm (27 lbs offset, 11 lbs bond) may be used providing the optional F-100, or F-101 'pre-folder' is selected (see 4.12.1), 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 (41 lbs offset).

When making thick saddle-bound booklets in the 5-10mm (0.2 – 0.4”) range from lightweight paper then a separate heavier-weight cover sheet is recommended to maintain good finished book quality.

6.20 *Wire stitching*

Standard 'flat' stitching

The standard Hohner 43/6S wire stitch head produces a flat stitch, using round section wire (0.4 – 0.6mm diameter) and has a max stitch thickness of 6mm (maximum book thickness 7-8mm).

The optional heavy duty Hohner 52/8S wire stitch head produces a flat stitch, using round section wire (0.4 – 0.6mm diameter) and has a max stitch thickness of 8mm (maximum book thickness 10mm).



Normal flat stitch

Producing books with 'loop' stitches (Option LST-100)



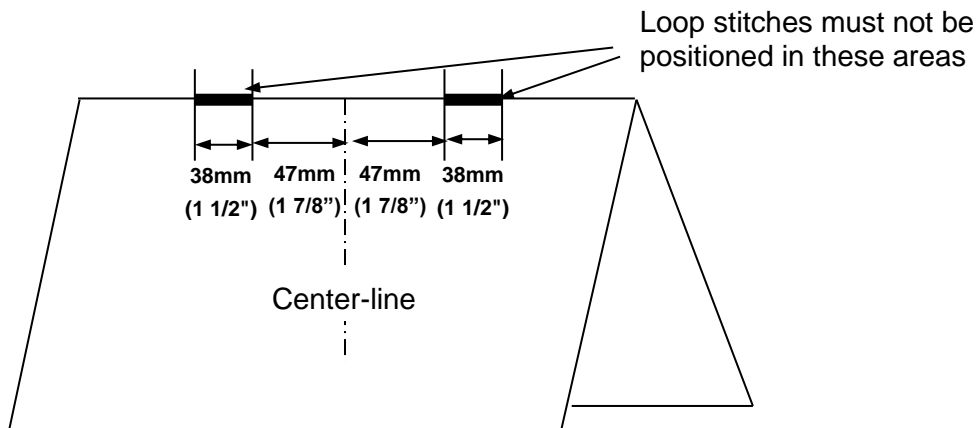
Loop stitch

Loop (Omega) stitches may sometimes be required in place of normal stitches in order 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 3 - 4mm (Maximum finished book thickness is 6 mm).

The use of loop-stitch heads requires a modification to the Smart-binder stitch-head drive (refer to IBIS for price quotation).

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.



Stitcher drive upgrade option LSM-100:

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

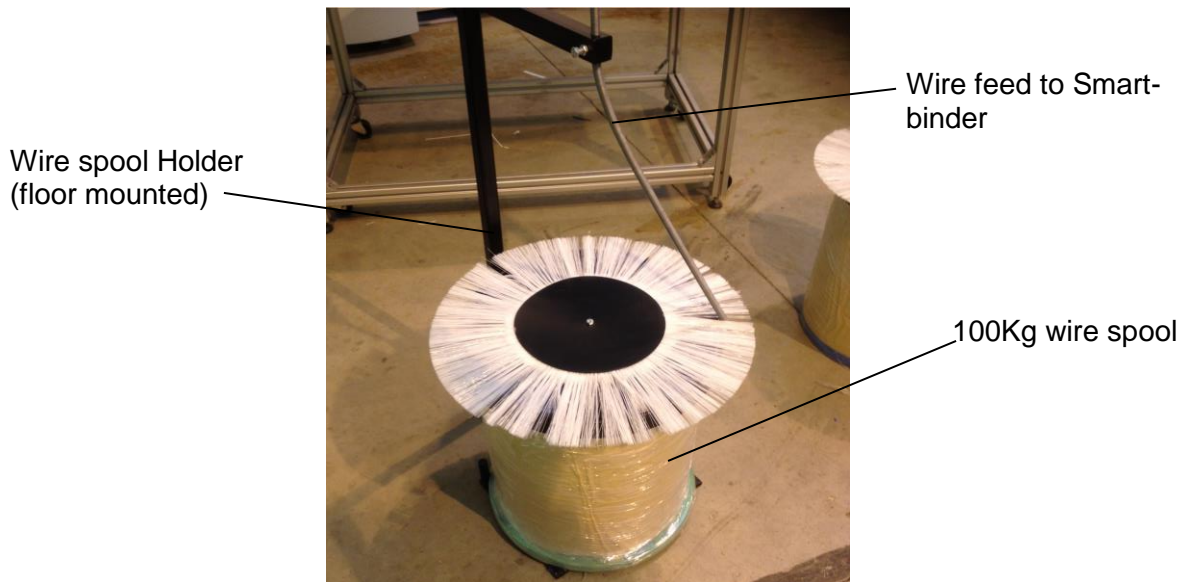
Stitcher drive inhibit option SDI-100

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.

100Kg Wire spools

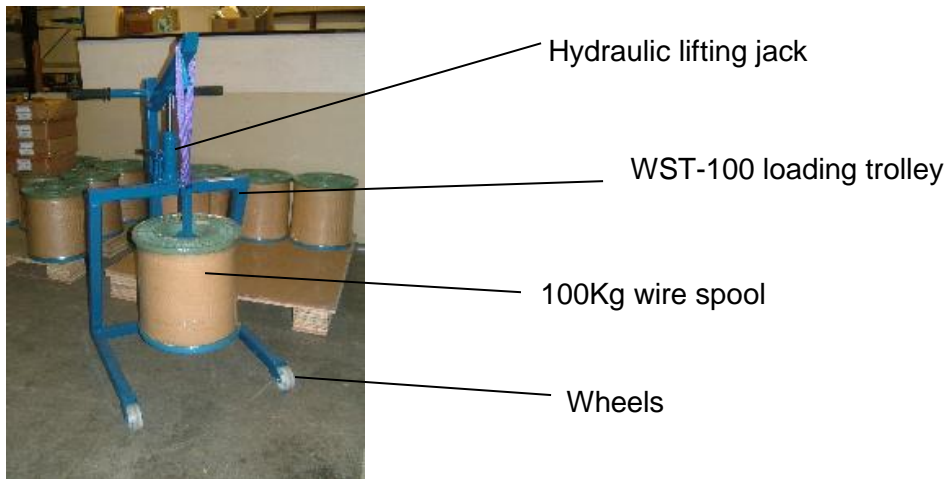
The standard Smart-binder is supplied with two **2.5Kg wire spools** mounted on the back of the stitcher.

A recommended option is to replace these with **100Kg 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).



Handling trolley for 100Kg wire spools

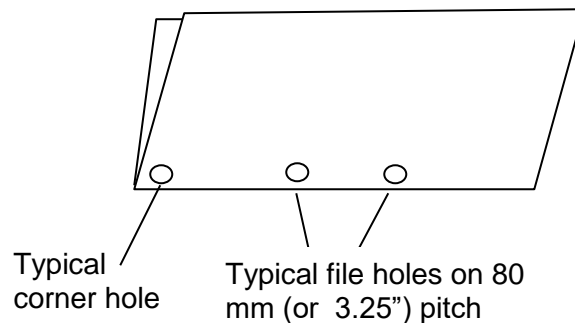
A wire spool handling trolley (option WST-100) is recommended for use with 100Kg wire spools in order to move the spools into position next to the Smart-binder sticher.



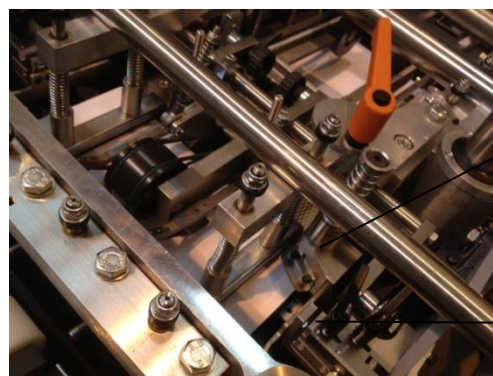
The trolley includes a hydraulic jack to lift the spools. Wheels allow easy movement around the factory floor.

6.21 **Producing books with holes (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.



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 to 4mm (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. The HPM-100 punch module is recommended for occasional 'intermittent' use only.

Contact IBIS for more details.

6.22 **Feeding Covers and/or insert sheets**

Covers or insert sheets fed from the cover feeder (Option CIF-100 or CIF -102)

See 6.8 and 6.9 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 sheets 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, in

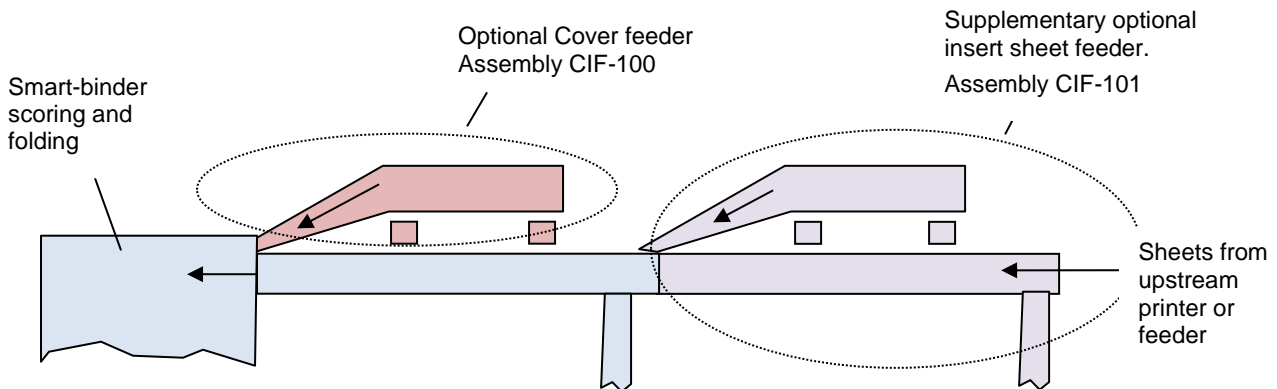
order to create this gap. If feeding from a pile feeder, then the gap in sheet feeding will be created automatically by the Smart-binder feeder control system.

The maximum cover feed rate from the CIF-100 is 50 covers/minute due to the need to pre-feed each cover to a stop position before then feeding into the folder. This may reduce the maximum output rate of books which contain a small number of pages. The maximum cover feed rate from the CIF-102 is around 100 covers/minute.

Feeding from two cover feeders (using optional extra feeder CIF-101)

Two adjacent cover feeders may be supplied so that cover (or insert) 'A' can be fed from Feeder 'A' and cover (or insert) 'B' from Feeder 'B'. An extra digit in the sheet bar codes will then determine whether Feeder A is activated or Feeder B 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)*

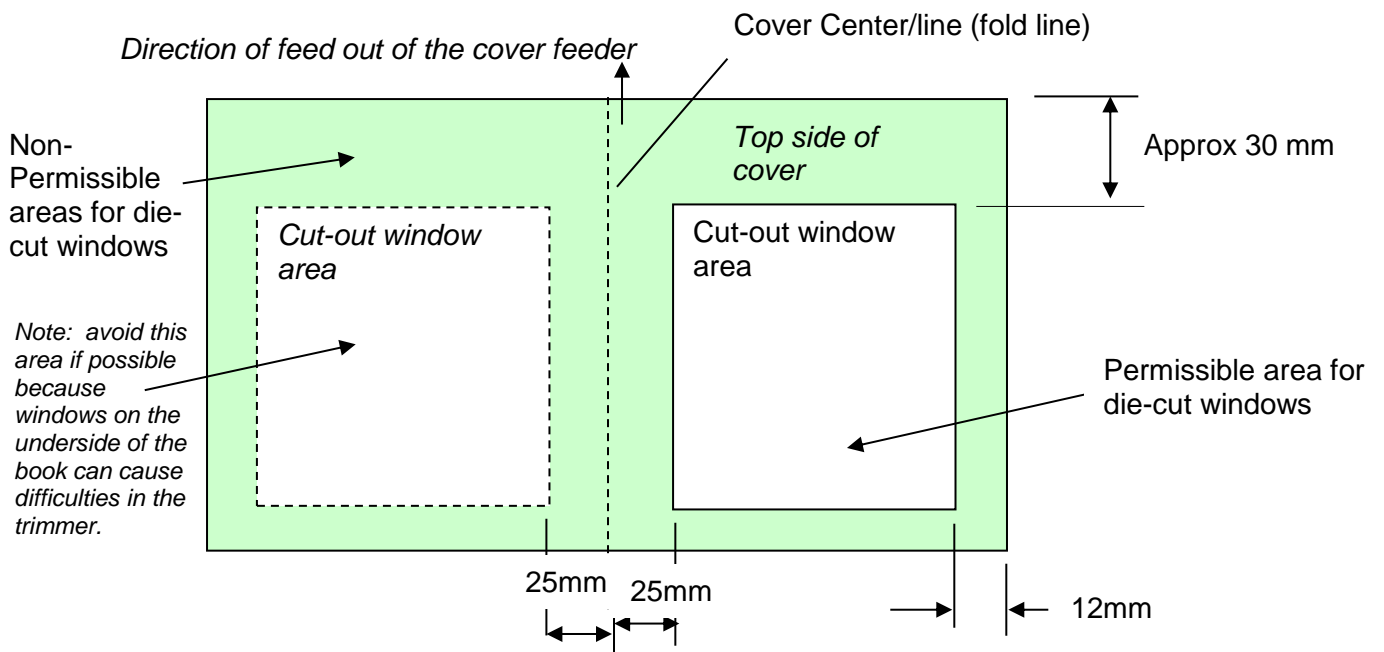
The CIF-101 is used in conjunction with the standard **Smart-binder cover feeder CIF-100 or 102**. Both are identical feeders, but the assembly CIF-101 includes a second sheet transport conveyor below. CIF-100 cover feeder assembly does not include a sheet conveyor below because this sheet conveyor is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



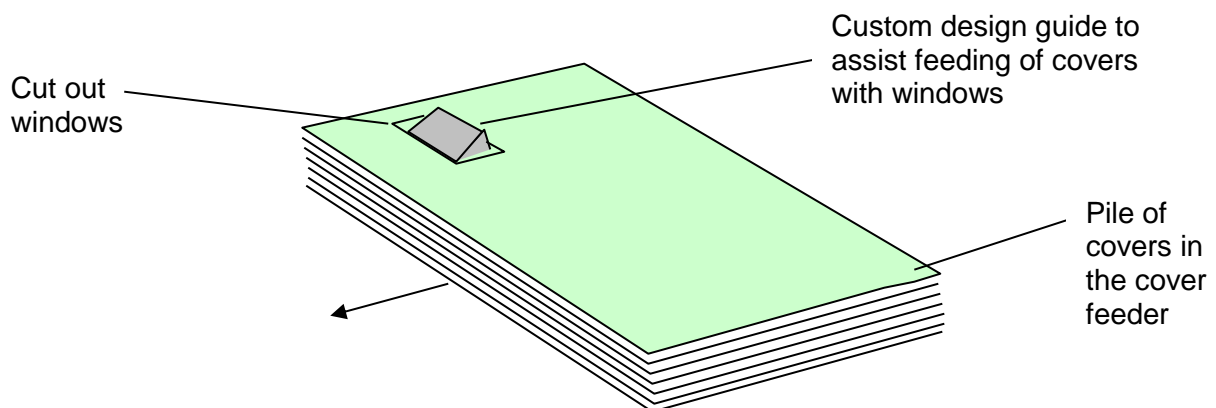
The CIF-101 is only needed if it is required to feed both a cover on the outside of the book, and an insert sheet inside the book. If only the insert sheet is needed then use the Cover/insert feeder CIF-100.

Covers with cut-out windows

Covers with cut-out windows may be able to be fed depending on the type of cover, and type of cut out. The window should be at least 30mm (1.2") 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):



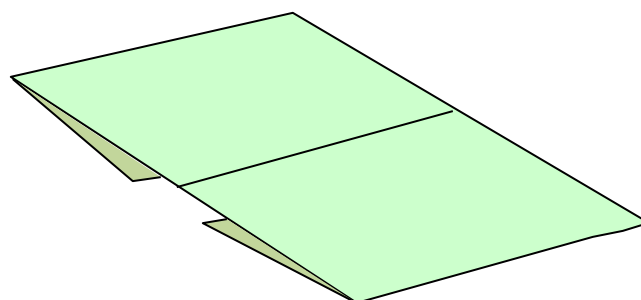
To help the feeding of covers with windows, IBIS can supply a special design 'guide' which fits inside the window hole.



This guide must be made to fit exactly the size of the cut-out window hole.

Covers with Gate Folds (winged covers)

Covers with gate 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.



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

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 4.17) 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.

Cover Bar Code Reader (option BCR-100 and BCR-101)

To check that the correct cover (or insert sheet) is being fed onto each book, select the optional cover bar code reading system (see also section 6.9) . This compares bar coded ID numbers printed on each sheet and on the covers (or insert) and alerts the operator if they do not match. Two types of reader are available. The standard bar-code reader is option BCR-105. A Datamatrix 2-D code reader option DCR-101 is also available.

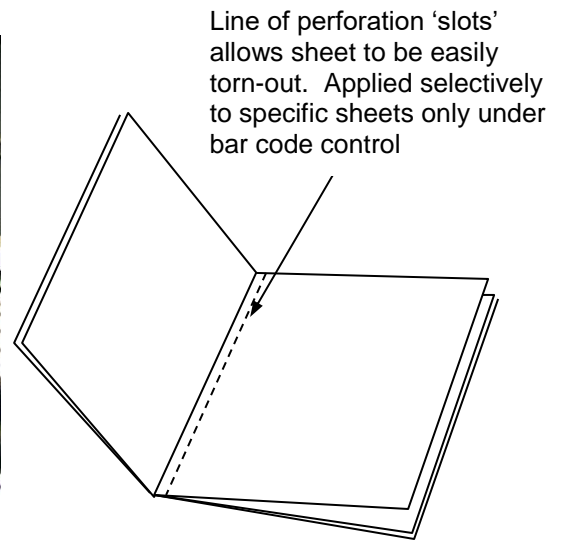
Feeding covers or inserts mixed with content sheets from the off-line pile feeder (Option SB-095)

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.

6.23 *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.



The addition of this module increases the machine length by 325mm.

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.

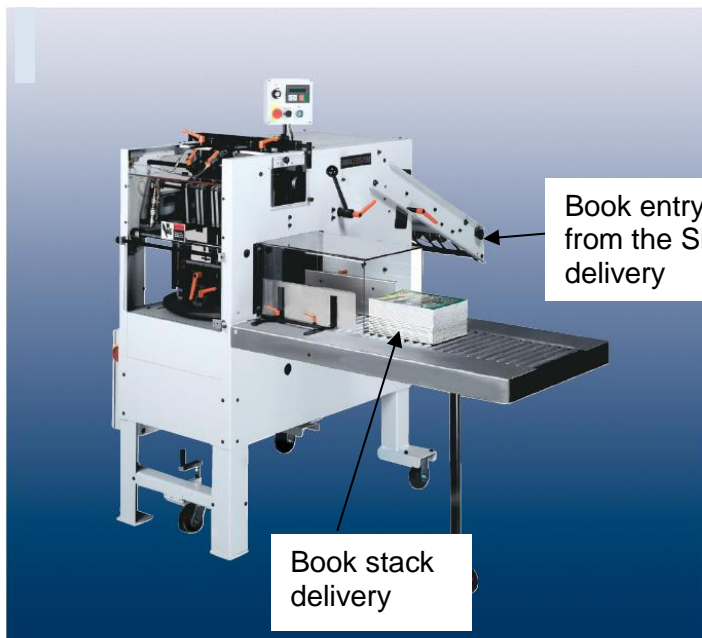
The DMP-101 option is provided with four independent perf heads.

Refer to IBIS for further details, if needed.

6.24 ***BSS-11 book stacker option***

The BSS-11 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 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-11 stacker may be fitted 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).

6.25 **Spine squaring module Option SM-101**

The Optional SM-101 spine squarer may be attached to the end of the Smart-binder book delivery conveyor in order to press the book spine into a 'square' shape and make the books lie flatter.



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

The SM-101 unit gives an acceptable result only when making thinner saddle-stitched books (up to about maximum 3-4 mm thick). Its maximum cycling speed is 1700 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 into a separate in-line stacker such as the BSS-11.

SM-101 Spine squaring module



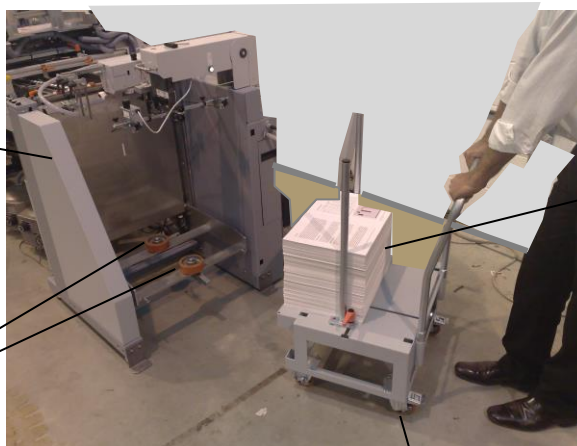
6.26 **Pile Loading Trolley system Option PLT-100**

The optional pile loading trolley system transports large piles of sheets easily from the printer drop stacker to the Smart-binder sheet feeder (if running off-line). The trolley plus the stack of sheets docks with the lift table on the pile feeder (SB-095 or SB-096).

The PLT-100 reduces the feeder reload time from about 3 minutes to about 35 secs, resulting in approx 10% improvement in system output.

PLT-100 Trolley used to transport sheets to the pile feeder

Smart-binder sheet pile feeder (modified to accept loading trolley)

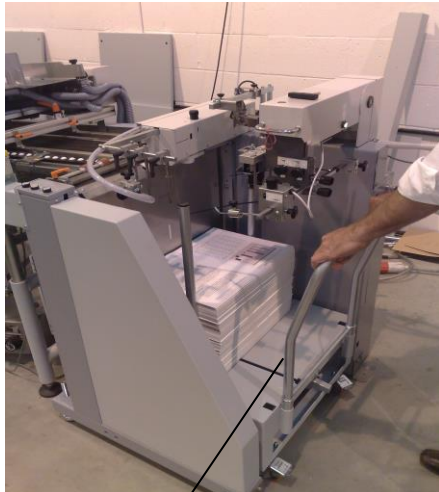


Loading trolley PLT-100 with pile of printed sheets. The trolley includes adjustable side guides for pile stability while being moved.

The pile feeder includes a pair of rubber guide wheels which guide the trolley accurately into position and a quick 'latching' system to hold it securely in this position.

Wheels for easy trolley movement between printers and Smart-binder

Trolley engaged with sheet feeder



The trolley handle is easily removed after the trolley is engaged with the feeder

Sheets feeding into Smart-binder from loading trolley PLT-100



Smart-binder infeed

The trolley now becomes the sheet 'pile lift table' and rises up automatically as the sheets are fed from the top of the pile.

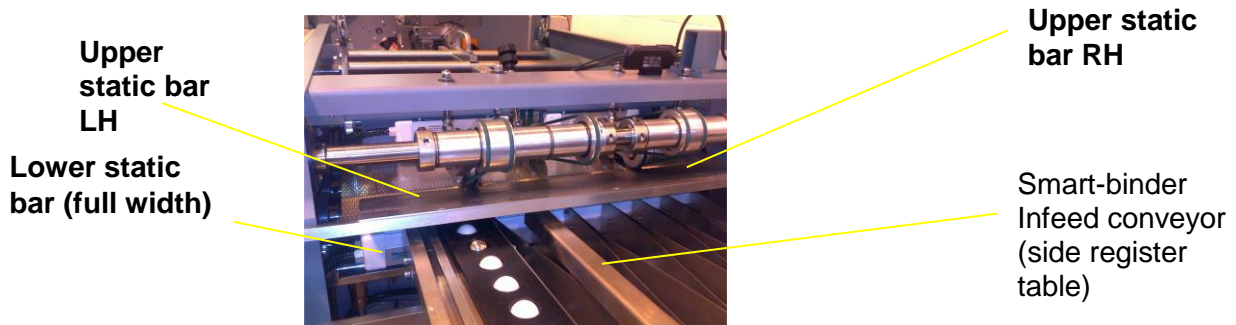
It is recommended that at least two loading trolleys are used per Smart-binder. Trolley #2 can then be loaded with the next pile of printed sheets, while Trolley #1 is engaged with the feeder and feeding sheets into the Smart-binder.

If Trolley #2 is already loaded with the next sheet pile when this next pile is ready to be loaded, then the Smart-binder 'stop' time to reload is only about **35 seconds**. This **increases the Smart-binder system output by about 10%**.

All existing off-line Smart-binders may be upgraded with the PLT-100 loading trolley system, after modifications have been made to the sheet pile feeder. For field retrofit, allow two days for an IBIS engineer at a customer site to modify the pile feeder, install the loading trolley, test operation and complete operator training.

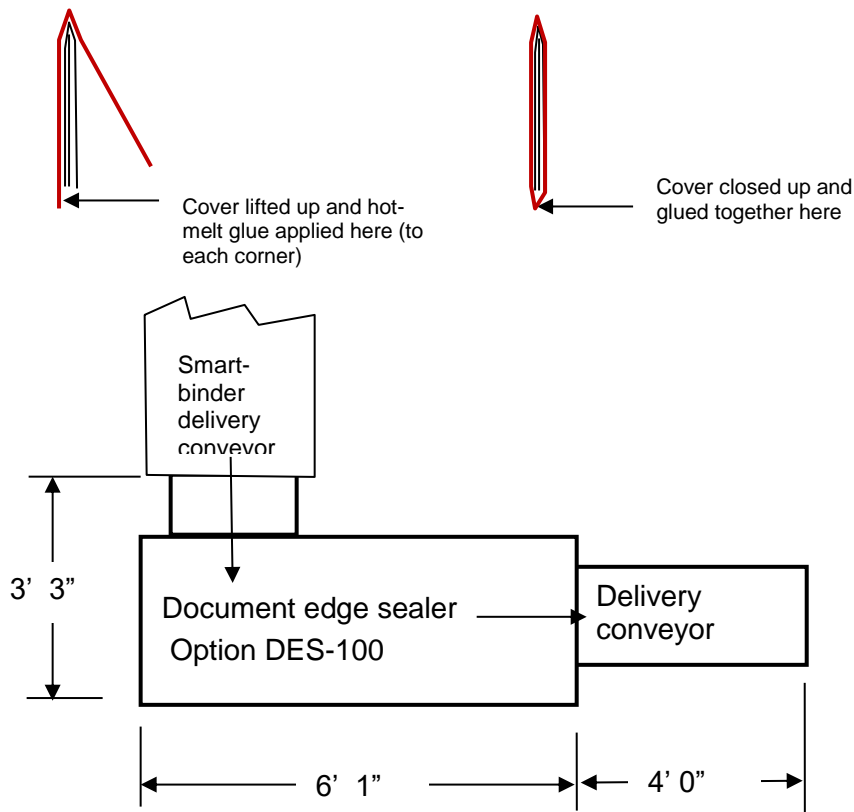
6.27 Anti Static system

The Smart-binder may be fitted with an optional anti-static system which is particularly recommended for use with lightweight paper stocks or when sheets are likely to contain a higher-than-normal level of static charge.



6.28 Document Edge Sealing DES-100

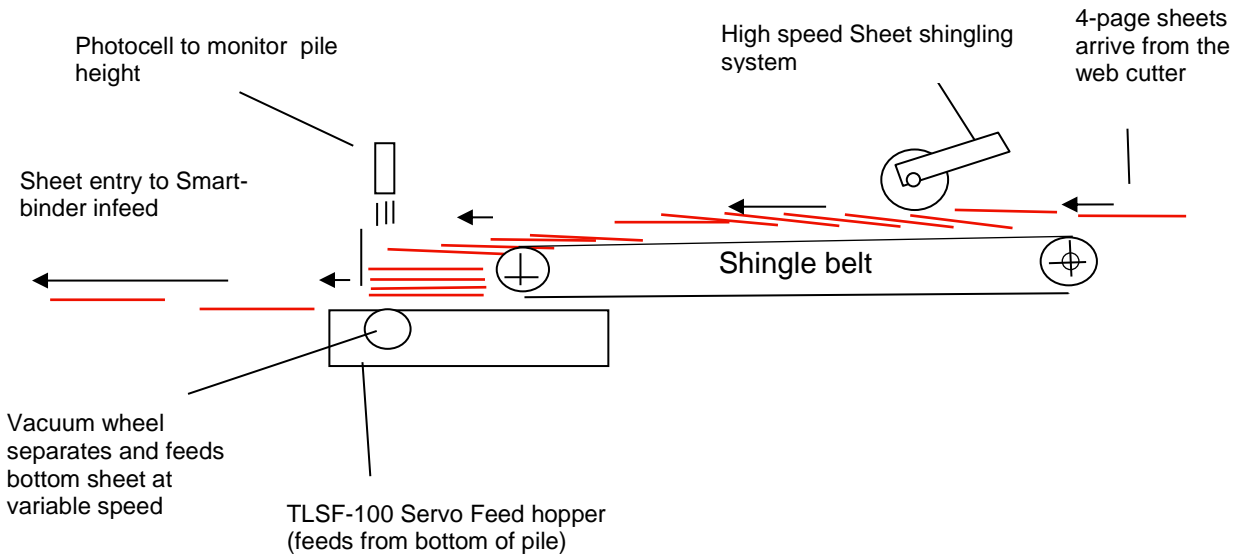
The optional document Edge Sealing system DES-100 may be installed in-line with the Smart-binder delivery. Edge sealing is achieved by making stitched (or ISG cold glued) booklets with a cover sheet which is wider than the inside sheets (in this case the inside sheets will not be front edge trimmed). 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.



6.29 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. The SBS-100 operates as follows:

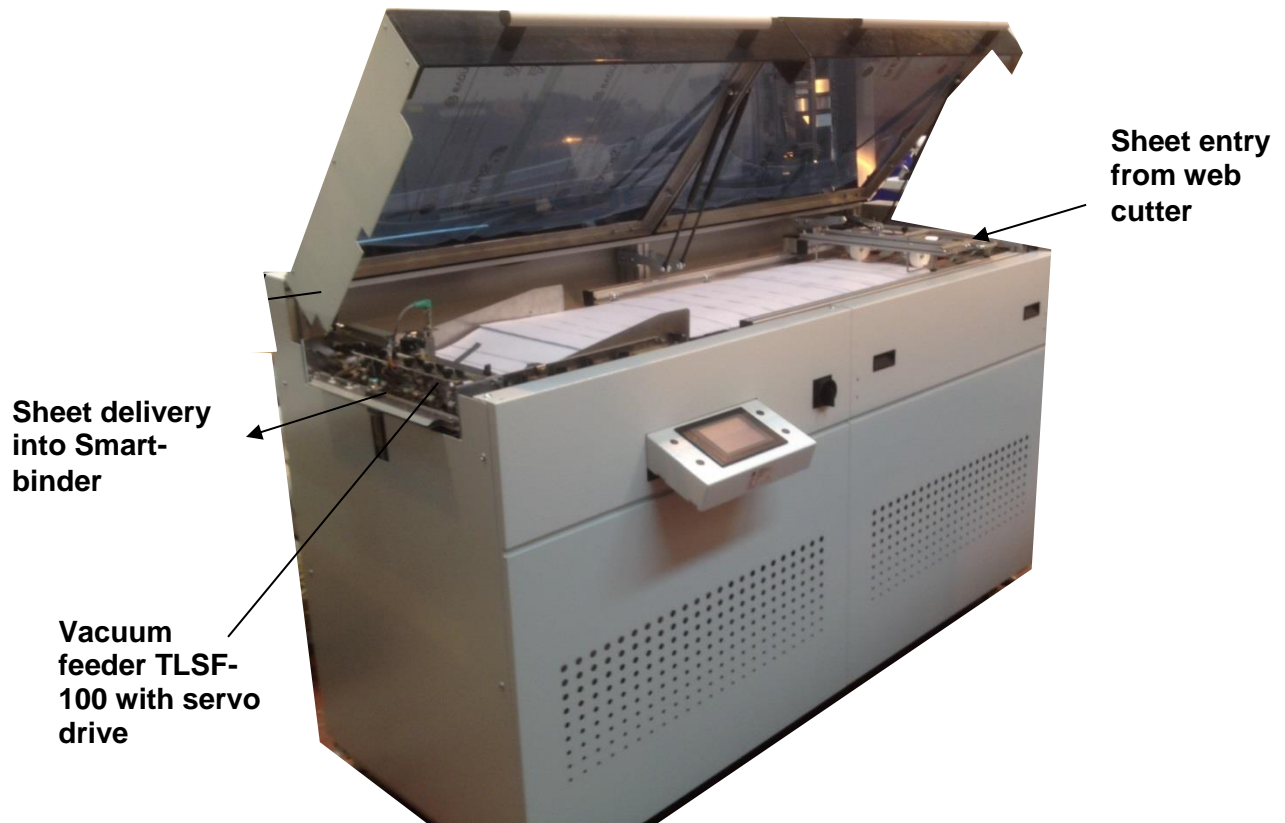
- 1/ Sheets from the web cutter are put into a shingled stream on the shingle conveyor. This shingle flows into the 'top loaded' sheet feeder TLSF-100. The TLSF-100 feeds sheets out from the bottom of the pile at a rate determined by the number of sheets in the booklet being made by the Smart-binder.
- 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.



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.

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 at a fixed cycling rate (continuous operating mode).

SBS-100 Sheet buffer module



6.30 Smart-binder Production Rates

Sheet infeed rates

6.30.1.1 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 a maximum arrival rate about 450-500 4-page sheets/minute (typically SR A3 or Ledger size sheets), which allows operation in-line with printers or near line from an unwinder/cutter at up to about 130 metres/min (426 feet/min) . However a 'sheet' may be folded, using an in-line cross-folder, to contain 8 (or 12) pages instead of 4 pages. In this case a web speed of 180 metres/min (590 ft/min), or faster, is possible. Our experience to date (as at July 2018) is with webs operating at up to around 150 metres/min (500 feet/min)

Note on producing 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).

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

Number of 4-page sheets in book (excluding separately-fed cover)	Number of pages in book (excluding separately-fed cover)					Printer web speed (Feet per minute)
		180	250	300	600	Printer web speed (Meters per minute)
		54.8	76.2	91.4	182.9	4-page sheets per minute (each sheet 12" long)
		180	250	300	N/A	8-page sheets per minute (each sheet 24" long)
		90	125	150	300	Output rate (books/minute)
2	8	90	N/A	N/A	N/A	
3	12	60	83.3	100	N/A	
4	16	45.0	62.5	75	N/A	
5	20	36	50.0	60	N/A	
6	24	30	41.7	50	100	
7	28	25.7	35.7	42.8	85.7	
8	32	22.5	31.3	37.5	75.0	
10	40	18	25.0	33.3	60.0	
12	48	15	20.8	25	50.0	
16	64	11.2	15.6	18.7	37.5	
20	80	9	12.5	15	30.0	
24	96	7.5	10.4	12.5	25.0	
28	112	6.4	8.9	10.7	21.4	
32	128	5.6	7.8	9.4	18.7	
36	144	4.7	6.9	8.3	16.7	

40	160	4.5	6.3	7.5	15.0
44	176	4.1	5.7	6.8	13.6
48	192	3.7	5.2	6.2	12.5

Notes on Saddle-bound book production rates

- 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 instead of 4-pages and production speeds are doubled (providing the maximum book output rate is not exceeded). If 8-page increments are not acceptable then the selective folder F-200 is available to retain 4-page increments.
- The table above is for one-up (no center knife) production, sheet cut-off of 305mm (12"). This is suitable for A4 booklet production. Letter size books typically use a sheet cut off of 11.5", which will increase book output rate by 4% when run in-line with a web printer.
- Two-up production (running with center knife) will double the book output rate.
- When running with very light or difficult paper, it may not be possible to achieve the maximum input speeds stated above. If in doubt, testing will be necessary.
- When running in line with a web printer, increasing web cut-off above 305mm (12") will decrease the book output rate. 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 90 books/min be exceeded.
- When running off-line a decrease in sheets per minute will reduce book output rate: for example, decreasing sheets per minute by 10% compared with the rates shown above will reduce book output rate by 10%.
- Normal off- line operation using the 'SB-PLUS model' is limited to 7,000 books per hour (or 14,000 in 2-up mode) and about 400 sheets/min input rate (exact rate depends on paper weight format size etc).
- System operation will be subject to occasional stops.. On a CF web system, time is needed to change paper rolls periodically, and there are stops due to printers and cutter. For off-line production 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 taken into account when estimating production capacity. Refer to IBIS for estimated Smart-binder operating efficiencies.
- System 'down-time' varies depending on circumstances, but as a guide:
 - Smart-binder make-ready time for 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 minutes , or 35 secs if using PLT-100 pile loading trolley) every 6 – 8,000 sheets
- For an in-line connected system, down time for other equipment must also be taken into account in estimating total production capacity.
- 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 successive sheets.
- The optional SM-100 spine squaring module reduces the maximum output rate to 23 books/min, if used in-line with the Smart-binder.
- The maximum book production rate of perfect bound books using the Sprint-binder 600R perfect binder (SB-4B or SB-5B only) is 600 books/hour depending on book thickness and required bind quality. The higher-speed 4-clamp Sprint-binder PB1200R perfect binder has a book output rate of 1,200 books/hour and the 4 clamp Sprint-binder PB-2000J has a max speed of 1500 books/hour.

Book Production Rates: A4 Perfect bound books (SB-4 and SB-5 only)

6.30.1.2 Using Sprint-binder PB-600 (in-line 1 clamp binder: max speed 600 books/hr)

Number of pages in book (excluding separately-fed cover)	Pages/minute produced by the printer				
	320 ppm	1000 ppm	1500 ppm	2400 ppm	
48	6.7	NA	NA	NA	Perfect Bound Book output (Books/min)
64	5.0	NA	NA	NA	
96	3.3	NA	NA	NA	
128	2.5	NA	NA	NA	
160	2.0	6.3	NA	NA	
200	1.6	5.0	NA	NA	
300	1.1	3.3	5.0	NA	
400	0.8	2.5	3.8	6.0	
500	0.6	2.0	3.0	4.8	
600	0.5	1.7	2.5	4.0	
700	0.5	1.4	2.1	3.4	
800	0.4	1.3	1.9	3.0	
900	0.4	1.1	1.7	2.7	
1000	0.3	1.0	1.5	2.4	

6.30.1.3 Using Sprint-binder PB-1200J (in-line 4 clamp binder: max speed 1200 books/hr)

Number of pages in book (excluding separately-fed cover)	Pages/minute produced by the printer			
	1000 ppm	1500 ppm	2400 ppm	
Less than 48	NA	NA	NA	Perfect Bound Book output (Books/min)
64	15.6	NA	NA	
96	10.4	15.6	25.0	
128	7.8	11.7	18.8	
160	6.3	9.4	15.0	
200	5.0	7.5	12.0	
300	3.3	5.0	8.0	
400	2.5	3.8	6.0	
500	2.0	3.0	4.8	
600	1.7	2.5	4.0	
700	1.4	2.1	3.4	
800	1.3	1.9	3.0	
900	1.1	1.7	2.7	
1000	1.0	1.5	2.4	

Notes on Perfect-bound book production rates

When using the in-line SB-4 configuration, then perfect bound book production speeds may be increased (providing the maximum output of the binder is not exceeded: 400 books/hr for PB-600, 1200 books/hr for PB-1200R) by using a cross-folder directly prior to the Smart-binder. In this case each sheet entering the Smart-binder infeed will contain 8-pages instead of 4-pages and production speeds are doubled. If 8-page increments are not acceptable then the selective folder F-200 is available to retain 4-page increments

Small book formats may be bound 'two-up'. In this case the output book production rates are doubled. A special additional trimmer is needed to split the two books apart after binding.

Booklet finished Format sizes

Typical booklets that can be produced on the Smart-binder 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)		11 x 8.5
US Digest size (1-up)		8.5 x 5.5
US Digest Oblong (2-up only)		5.5 x 8.5
US Oblong (1/4 letter) (2-up only)		4.25 x 5.5

Refer to IBIS for booklet sizes outside this range

Note: When making saddle-bound booklets then a special trimmer modification is needed to allow production of books with finished spine lengths in between 157 and 210mm. e.g.: DVD booklets.

The extended model **Smart-binder SB-X** can produce A5 or Digest size booklets in 2-up mode (using the optional trimmer center-knife).

Size	Metric dimensions (mm) (Spine length x width)	Inch Dimensions (Spine length x width)
A4 (1 up)	297 x 210	
A5 Portrait (2-up)	210 x 148	
A5 landscape (2-up only)	148 x 210	
US Letter size (1 up)		11 x 8.5
US Digest (2-up)		8.5 x 5.5
US Digest Oblong (2-up only)		5.5 x 8.5

7 Specifications

7.1 Smart-binder 'PLUS HS' model Specifications

Maximum input speed (when fed from a web cutter)

Without extra option F-100/F101 buckle folder	With extra option F-100/F101/F-200 buckle folder
130 metres/min (books are made from an integral number of 4-page sheets)	180 metres/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
Approx 400 4-page sheets/min (1600 pages/min)	Approx 325 x 8-page sheets/min (2600 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	Using Sprint-binder PB-600: 400 books/hour (one up)
	Using Sprint-binder PB-1200R 1,200 books/hour (one up)

Smart-binder SB-2, 3, 4 or 5 : Sheet Sizes as presented to the infeed conveyor

Sheet Input Size	Leading edge (long edge)	Width (short edge)
Maximum	464mm (18 ¼")	320mm (12 9/16")
Minimum	250mm (9 7/8")	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 1/8") or less than 105mm (4") from either side edge.

Smart-binder SB-XW 'extended model': Sheet Sizes as presented to the infeed conveyor

Sheet Input Size	Leading edge (long edge)	Width (short edge)
Maximum	622mm (24.5")	457mm (18")
Minimum	250mm (9 7/8")	273mm (10 3/4")

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 232mm (9 1/8") or less than 105mm (4") from either side edge

Cover Sizes (for saddle-binding only) SB-2, 3, 4 or 5

Cover input size	Leading edge (long edge)	Side edge (short edge)
Maximum	464mm (18 1/4")	320mm (12 9/16")
Minimum	250mm (9 7/8")	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 1/8") 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).

Smart-binder SB-2, 3, 4 or 5 Finished Book Sizes (Saddle-bound booklets after trimming)

Description	Spine length	Spine to Fore-edge book width
Maximum	320mm (12.6")	225mm (8.8")
Minimum	** 210mm (8")	* 120mm (4.72")
***Maximum when using 6.35mm (1/4") center trim-out knife	157mm (6.18") each book (thin books only)	225mm (8.8")
***Minimum when using 6.35mm (1/4") center trim-out knife	102mm (4") each book (thin books only)	120mm (4.72") (thin books only)

* Refer to IBIS if trimmed book widths down to a minimum of 95mm (3.75") are required

** Refer to IBIS if book spine lengths between 157 and 210mm are needed

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

Smart-binder SB-XW Extended model: Finished Book Sizes (Saddle-bound booklets after trimming)

Description	Spine length (X stretch)	Spine to Fore-edge book width (W stretch)
Maximum	450mm (17.7")	273m (10 3/4")
Minimum	280 (11")	120mm (4.72")

Note: larger sizes are possible if no trimming is needed

Trim off (saddle-bound books only)

	Maximum	Minimum
Front Knife and Side knife trim off	<i>Before April 07:</i> 20mm (0.79") on all three side <i>From April 07:</i> Front knife 27mm (1.06") Side knife 20mm (0.79")	0mm *
Center knife trim out	0mm, 6.35mm or 9.525mm (1/4" or 3/8") (other sizes by special quote).	

***Note:** A trim off between 0 and 3mm (1/8") is not recommended.

Book Thickness

	Maximum	Minimum
Without center-knife installed	10mm (3/8"): for A4 booklets 7- 8mm (0.3") for A5 booklets	1 sheet = approx. 0.2 mm (.008")
With center-knife installed	10mm with no trim-out (split only) 3mm (1/8") for 6.35mm (1/4") trim-out 4.5mm (3/16") for 9.525mm (3/8") trim-out	2 sheets = approx. 0.4 mm (1/64")
When making perfect bound books (SB-4 or SB-5)	60mm	2 sheets = approx. 0.4 mm (1/64"): saddle-bound Approx 3mm (0.12"): perfect bound

Paper Weight Specification

Description	Paper stock weight	Cover stock weight
Maximum	160gsm / 108 lbs offset / 43 lbs bond	230gsm / 154 lbs offset / 61 lbs bond **
Minimum (without F-101 pre-folder)	50 gsm / 34 lbs offset/ 13 lbs bond * , providing grain is parallel to spine.	70gsm / 47 lbs offset / 19 lbs bond
Minimum (<u>with</u> F-101 pre-folder model)	40 gsm / 27 lbs offset/ 11lbs bond * providing grain is parallel to spine	70gsm / 47 lbs offset / 19 lbs bond

* Note: The minimum paper weights quoted above assume that the paper grain direction is parallel 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 are increased.

*** Note: refer to IBIS if wanting to run covers heavier than 230 gsm to confirm suitability.
Refer to IBIS if wanting to run sheets lighter than 60 gsm without using optional F-101 folder

Wire-stitch specifications

Description	Maximum	Minimum
Stitch Thickness	5mm (0.2 ") (Approximately 50 sheets of 70gsm= 10mm thick booklet)	2 sheets (8 pages)
Wire Stitches	Up to 4 stitches per book. 12mm flat stitch, 0.4mm to 0.6mm (0.016 to 0.024") diameter round wire. Optionally 12mm loop stitch (6mm diameter loop) round wire	Minimum stitch spacing 43mm (1.89") center-line to center-line Minimum distance from stitch to edge of untrimmed book - 28.5mm(1 1/8")

Glue specification

Description	Glue type	Application
ISG cold glue	Eukalin PVA cold glue (specification 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 approx 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.

7.2 Rotator/folder RF-100 Specifications:

Performance:

Speed: approx. 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 (18 1/4" x 12 1/2")

Min. sheet size: width 297mm x length 210mm (11" x 8 1/2")

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 plus or minus 50mm (adjustable)

Delivery Height: 80 –100mm lower than the infeed height

Paper weights:

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

Electrical:

A CEE-plug is used for electrical connection.

Voltage: 400V 3-phase

Frequency: 50/60Hz

Fuse: T 16A

Agency approvals:

CE Conformity

GS - Mark

7.3 **BS11 Stacker specifications**

Refer to IBIS for details

7.4 **SM-100 Spine squarer specifications**

Refer to IBIS for details. *Important note: The maximum output rate from the SM-100 is 23 books/min and maximum book thickness (for high quality 'squaring') is about 3-4mm.*

7.5 **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

Minimum book size: 210 (spine) x 100mm

Maximum book thickness: 60mm (or 50mm if using optional in-line CMT trimmer)

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

Paper weight: normal range 70 – 140 gsm

Glue temperature: 115 – 180 degrees C.

7.6 **Sprint-binder 1200R (4-clamp) perfect binder specifications**

- Number of clamps: 4
- Maximum speed: 1200 books/hour
- Maximum book size : 350 (spine) x 320mm(or optionally 450 x 320mm)
- Minimum book width: 150 x 100mm
- Book thickness (compressed): 3- 60mm
- Power required: 20 Kw
- In-line connection to digital printer: yes (using either sheet folders + stacker and JDF interface, or using 'accumulator roller' conveyor connection to web cutter-stacker)
- PUR Option: yes (PUR Roller glue tank or PUR extruder available)
- Automated book size and thickness changes: yes (using servo motors and pneumatic controls).

7.7 CMT-130 trimmer specifications (when used as part of the SB-4 or SB-5 system)

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 lbs / 680 kg
Shipping Weight (approximate)	1800 lbs / 816 kg

ELECTRICAL

3 Phase, 60 Hz, AC 208/230 Volts, 25 Amps (service size 40 Amps)

COMPRESSED AIR REQUIREMENTS





The CMT-130 requires 80-90 PSI regulated, dry, non-lubricated compressed air at a minimum of **5** cubic feet per minute (at 80-90 PSI). 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)

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

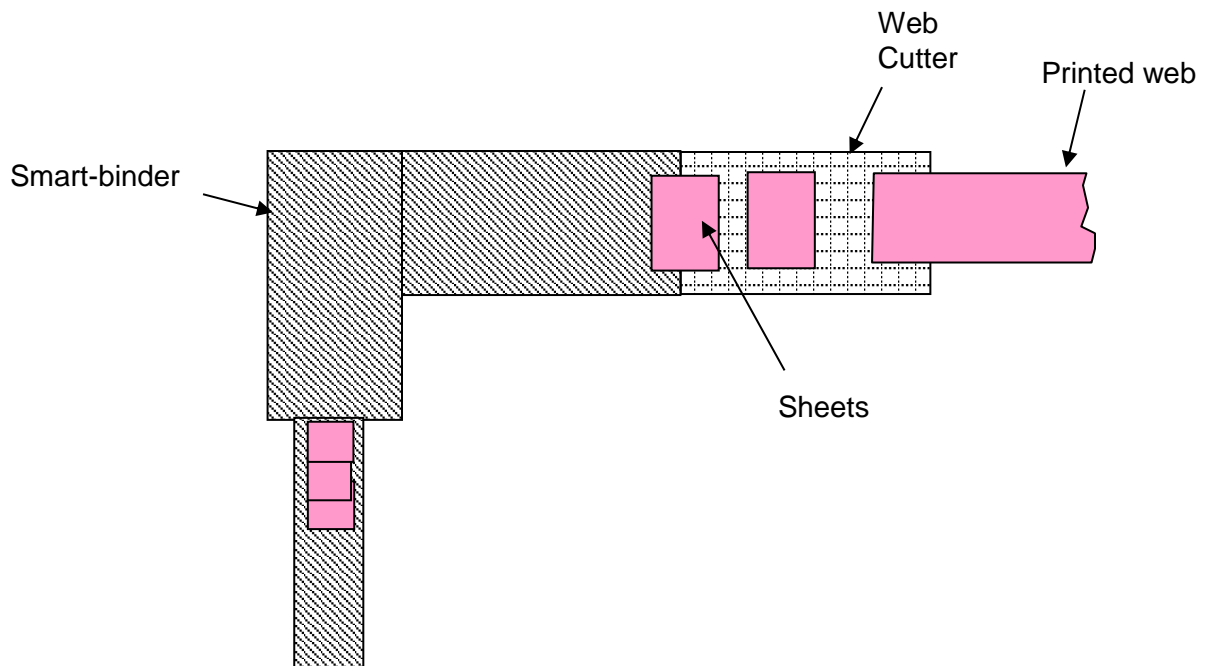
8 Smart-binder SB-1, SB-2 and SB-3 Configurations

8.1 Example Configurations for common applications.

Key

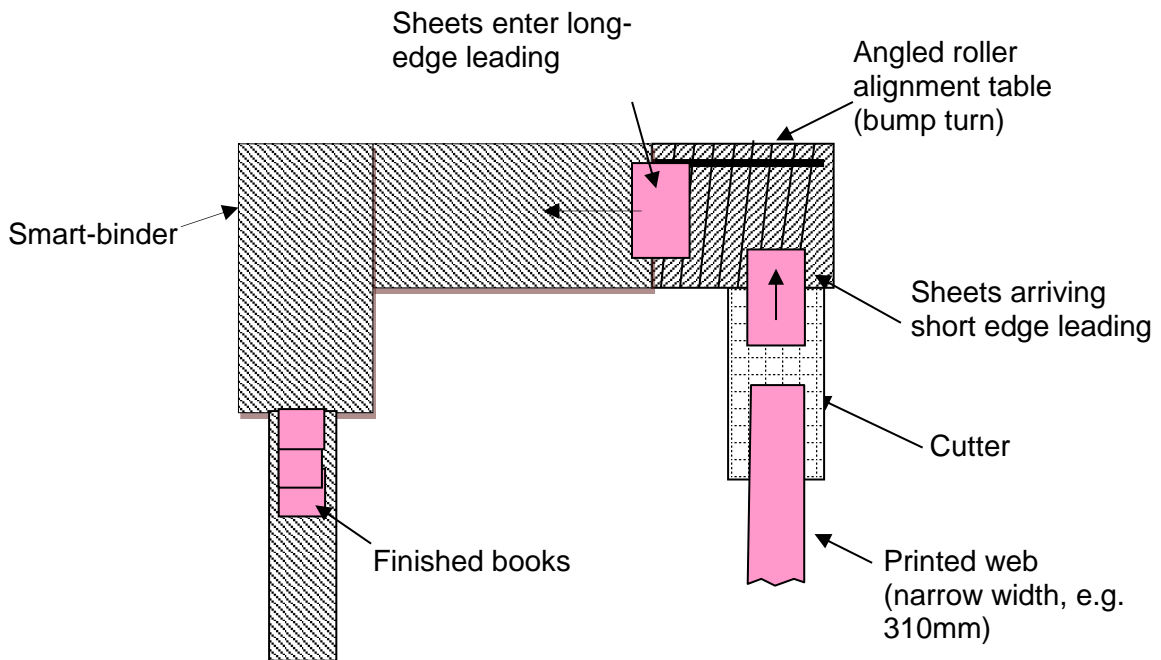
-  Standard Smart-binder
-  Smart-binder optional equipment
-  Equipment supplied by other manufacturers
-  Sheets and Books

In-line configuration - wide or narrow web



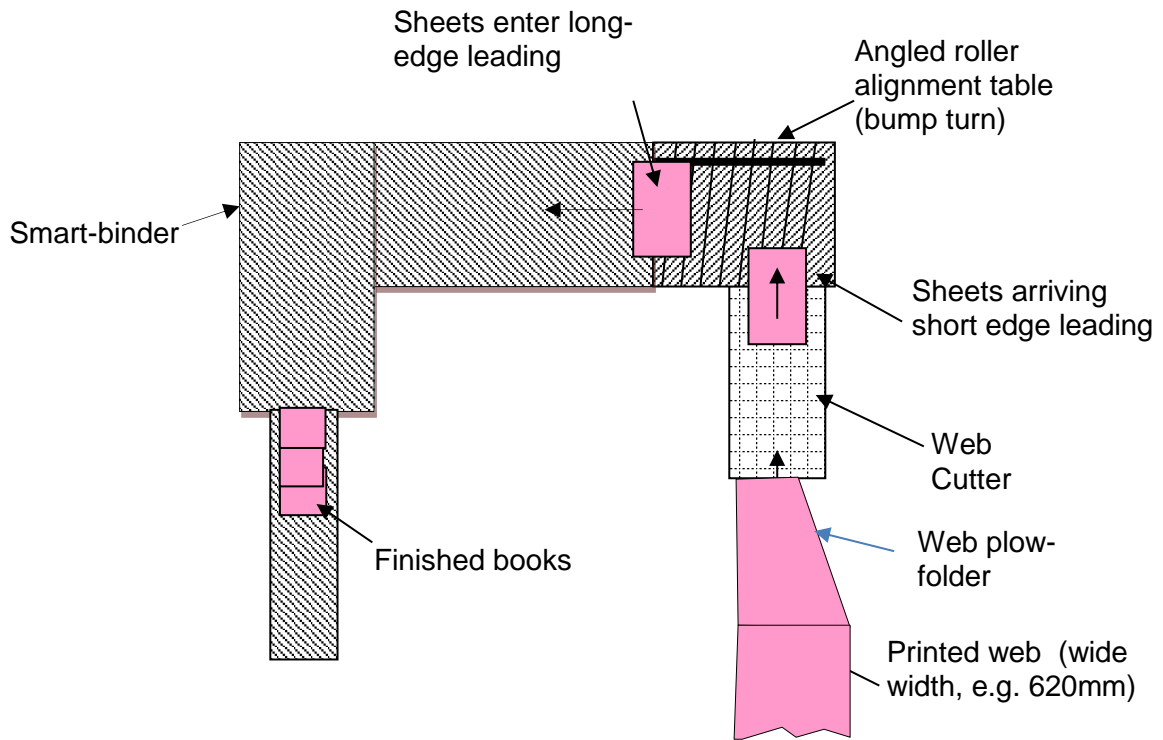
Advantages	Disadvantages
Simplest configuration will give the best up-time	Small format books (e.g. A5) have to be made from a narrow web, which reduces the printer's efficiency.
	Narrow web-width printers can only make small format books.

In-line configuration - narrow web to make A4 size books



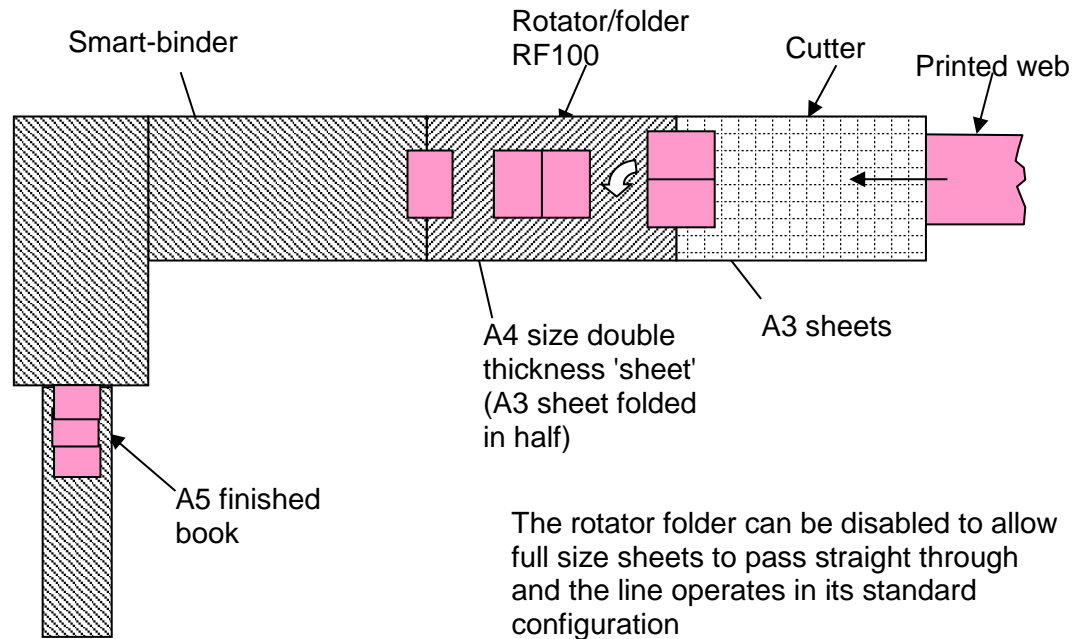
Advantages	Disadvantages
Can make large (A4 & US letter) books in-line from a 'narrow' (eg 320mm wide) web	Cannot make smaller (A5/Digest) sizes inline (except landscape/oblong sizes using trimmer centre-knife) .
	Stocks lighter than 70gsm may not reliably 'bump' turn and any stock must be tested to verify that it can be handled in this way.
	The need to bump turn each sheet may reduce the maximum printer web speed.

In-line configuration – wide web to make A4 size books



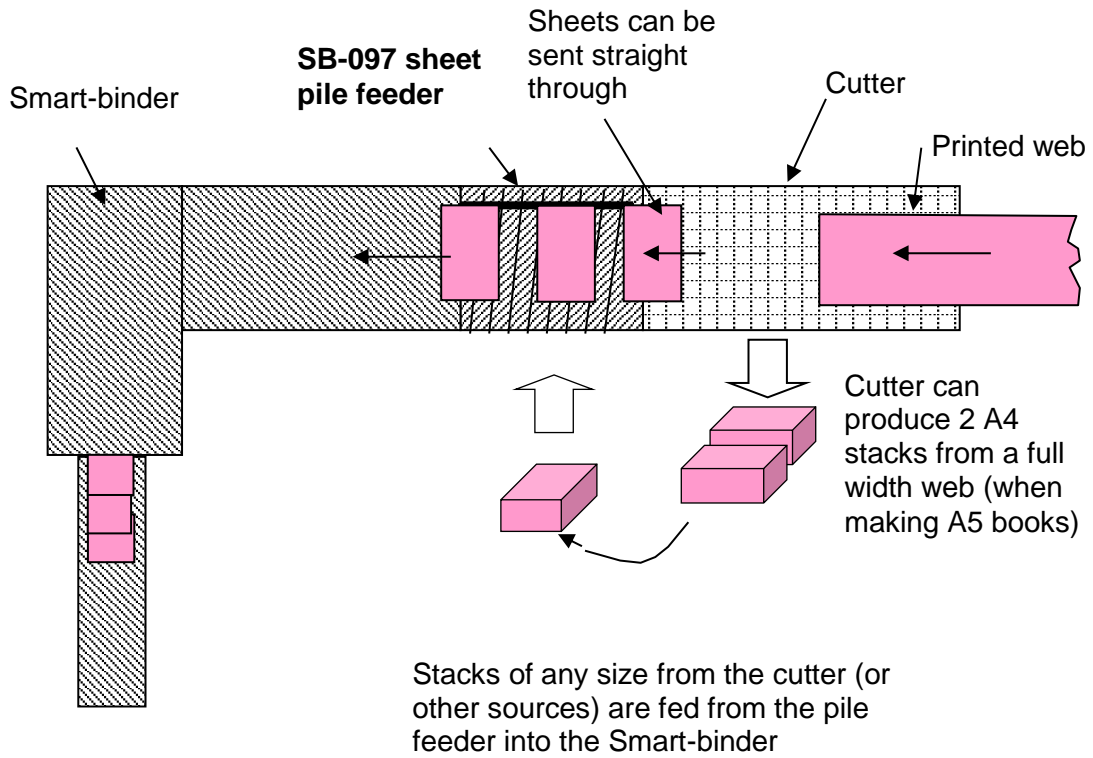
Advantages	Disadvantages
Can make A4 & US letter booklets using 620mm wide web.	Cannot make smaller (A5/Digest) sizes inline (except landscape/oblong sizes using trimmer centre-knife) .
The folded sheets are easier to bump turn than non-folded sheets	The need to bump turn each sheet may reduce the maximum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

In-line configuration with rotator/ folder to make small size books.



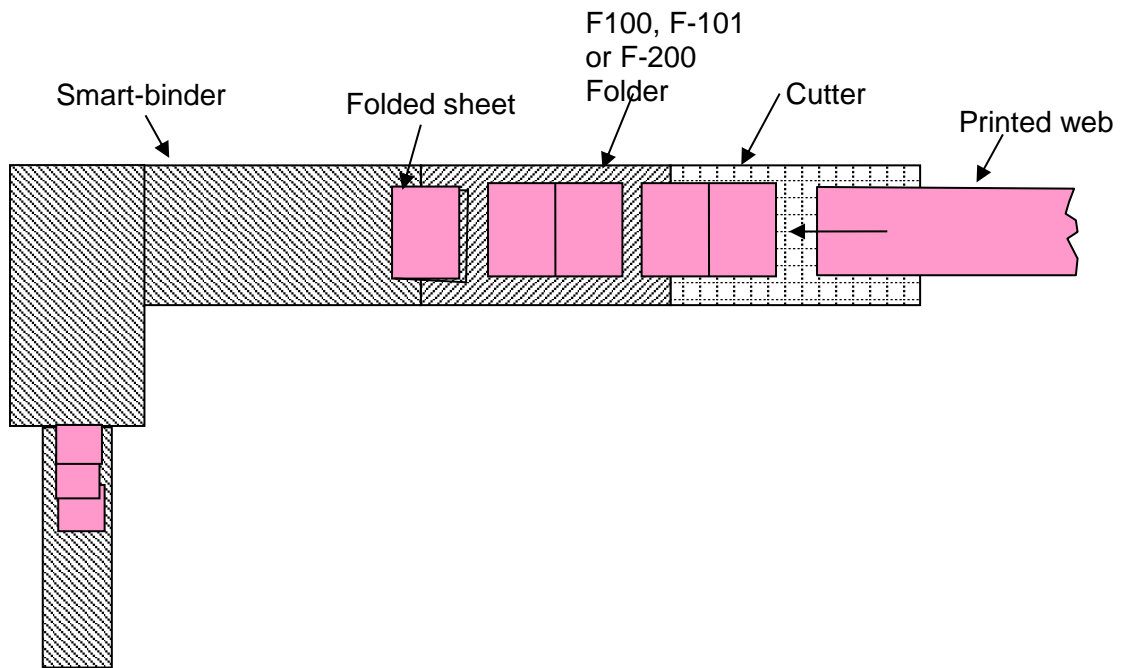
Advantages	Disadvantages
Can produce small size books (A5 / Digest) from same 'wide' web as larger books (A4 / Letter). This utilises the full print width and giving quicker changeovers between A4 and A5 by avoiding a web change.	Extra elements complicate the system and increase its cost.
	A5 Books must 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 60gsm 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 metres/min .

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



Advantages	Disadvantages
Flexibility of feeding from piles, which can come from more than one printer or from other sources.	Slightly more complex arrangement
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 to produce small-format size booklets (e.g. A5). Allows books to be made in 4pp increments.	

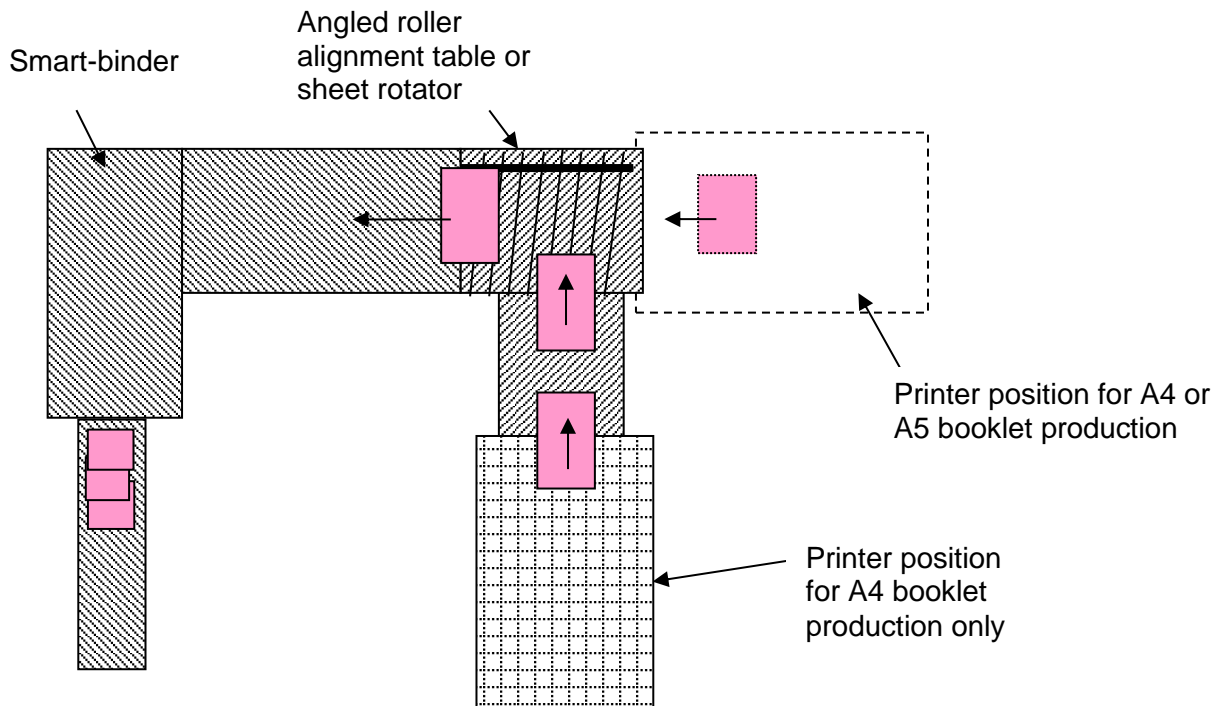
In-line with extra F-100 folder to allow higher web speeds or lighter paper stock



Advantages	Disadvantages
Assists use of lightweight (< 60gsm) stocks, <u>and</u> Increases maximum web speed to approx 200 metres/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.

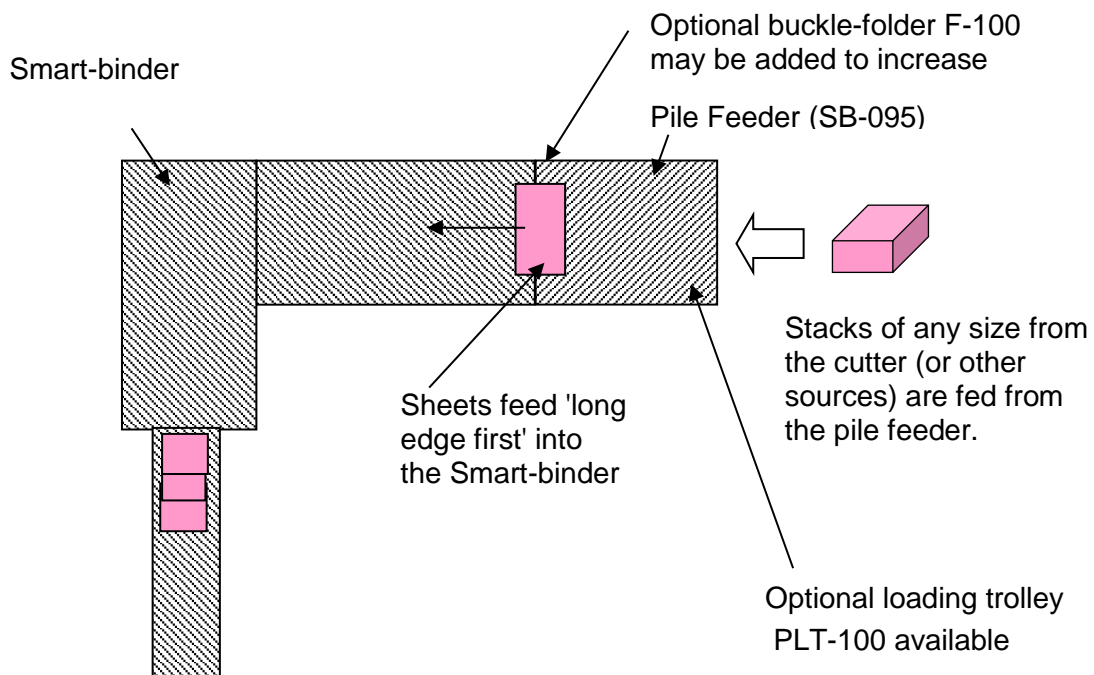
** Note: Maximum number of pages in the book may be restricted because the maximum specified thickness of 10mm (0.4") must be applied to the thickness of all the sheets together, measured at the thickest point: i.e.: at the edge folds.*

In-line with cut-sheet printer



Advantages	Disadvantages
In-line operation eliminates manual sheet handling.	
DFA/DFD link available with printer. No barcodes needed	

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	

8.2 **Selecting a configuration (In-line, near-line or off-line)**

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.
- Maximises 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.

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.

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.

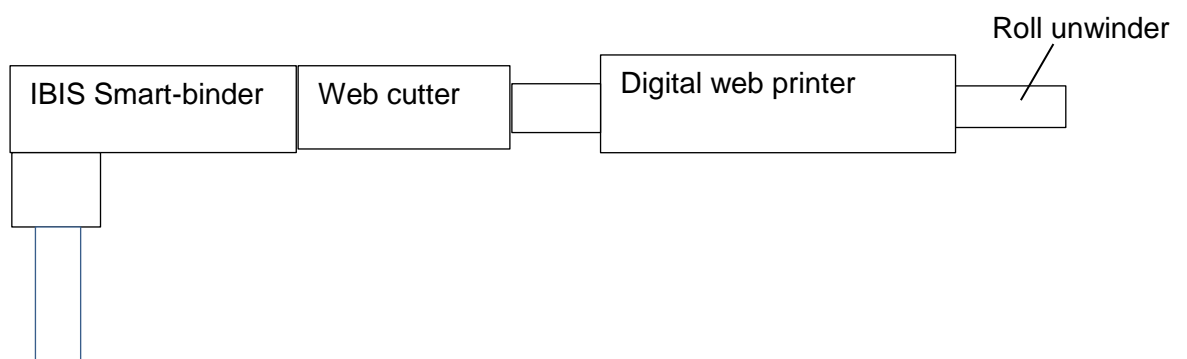
- An off-line Smart-binder can feed sheets faster than the speed at which sheets are printed on some printers (e.g. cut-sheet printers or many color printers). This means that one off-line Smart-binder can sometimes be used to finish the sheets produced by more than one printer.
- Running off-line gives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

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 offline, with quick changeover between the two modes.

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

1/ Finishing in-line with a digital web printer



Advantages:

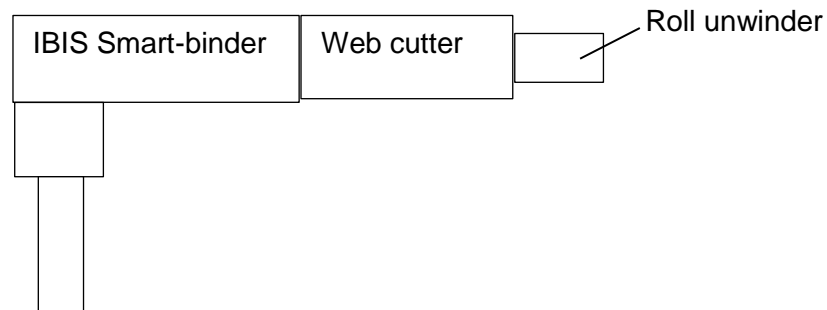
- Booklets are produced within seconds after printing: no delays.
- Reduced number of operators needed: no intermediate paper handling required.
- Printed sheets are immediately converted into finished booklets which increases security and reduces risk of any data breach. This is particularly important 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

2/ 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:

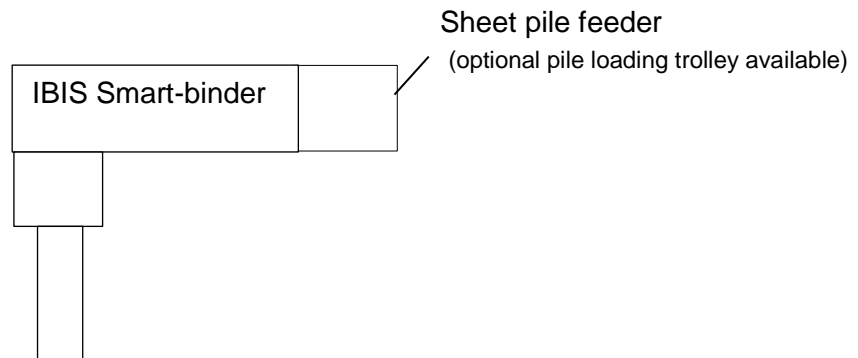
- It can take up to 2 hours for the printer to produce a printed roll which delays the finishing process
- An additional roll re-winder and un-winder are needed (extra cost compared with in-line finishing)
- Paper rolls have to be manually moved from the printer and loaded onto the finishing system roll 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 feeder in order to offer also the benefits of feeding off-line, when needed.

3/ 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 different format sized booklets and when booklets are personalised with matching covers.

8.3 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)

Web Cutters

8.3.1.1 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)

8.3.1.2 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, in order to enter the Smart-binder.

8.3.1.3 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.

8.3.1.4 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 max speed of the cutter must be limited to avoid exceeding the max 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'

8.3.1.5 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. Optional anti-static equipment is available for the Smart-binder, if needed (Option ASS-100).

8.3.1.6 Different types of Web Cutters

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

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 may not be required when running in-line with ink-jet printers because the paper is not heated to the same extent as toner printers.

9 Print impositioning schemes

9.1 *Example impositions*

Key to impositioning schemes



Side trim, removed by side knives, recommended range 3 to 20mm



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 when this option is used, the center knife removes 6.35mm ($\frac{1}{4}$ ") or 9.525mm ($\frac{3}{8}$ ") but limits 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.

A4 or 8 ½ x 11” finished format size

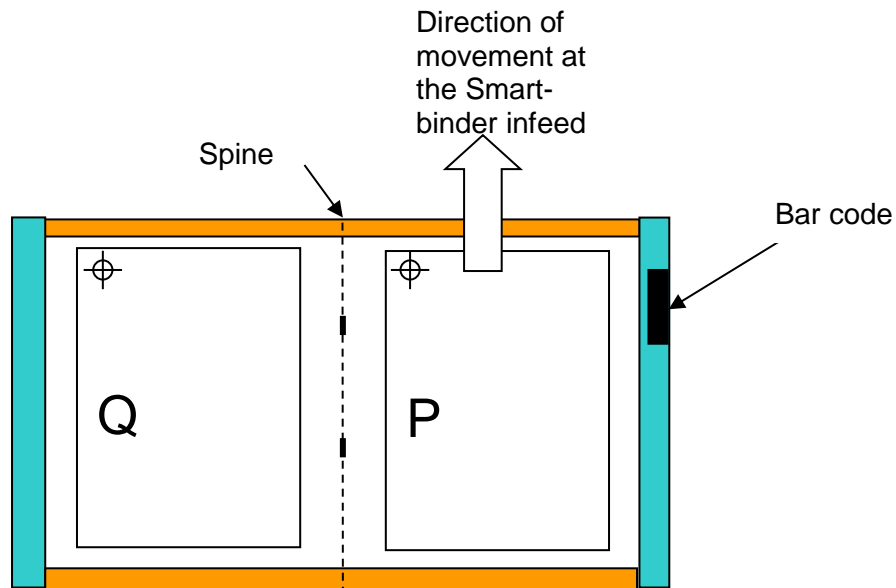
	A4 size (297 x 210mm)	Letter size (11 x 8½”)
Web Width	430 – 460mm	17 ½ - 18 ¼”
Sheet cut length	305 – 320mm	11 ½ -12 ½”

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 imposition 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	$2^{*}(n-m)+2$	$2^{*}(n+m)$

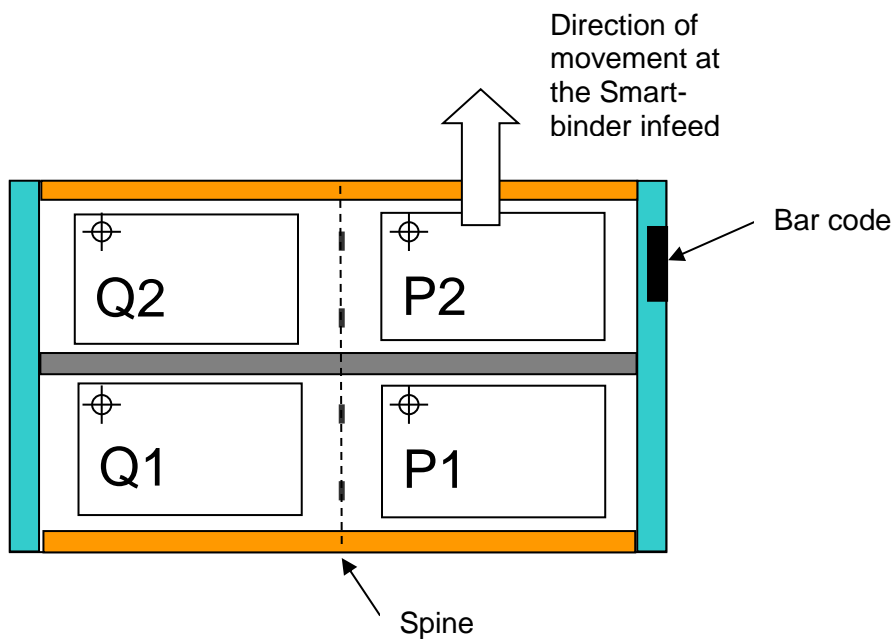
Note: It is assumed that Printer #1 prints on the under-side of the sheet and printer #2 prints on the upper side of the sheet

A5 landscape (or 8 1/2 x 5 1/2" oblong) finished size

	A5 size (Landscape) 148 x 210 mm	1/2 letter size (oblong) 5 1/2 x 8 1/2"
Web Width	430 – 460mm	17 1/2 - 18 1/4"
Sheet cut length	310 – 320mm	11 3/4" –12 1/2"

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	$2*(n-m)+2$	$2*(n+m)$

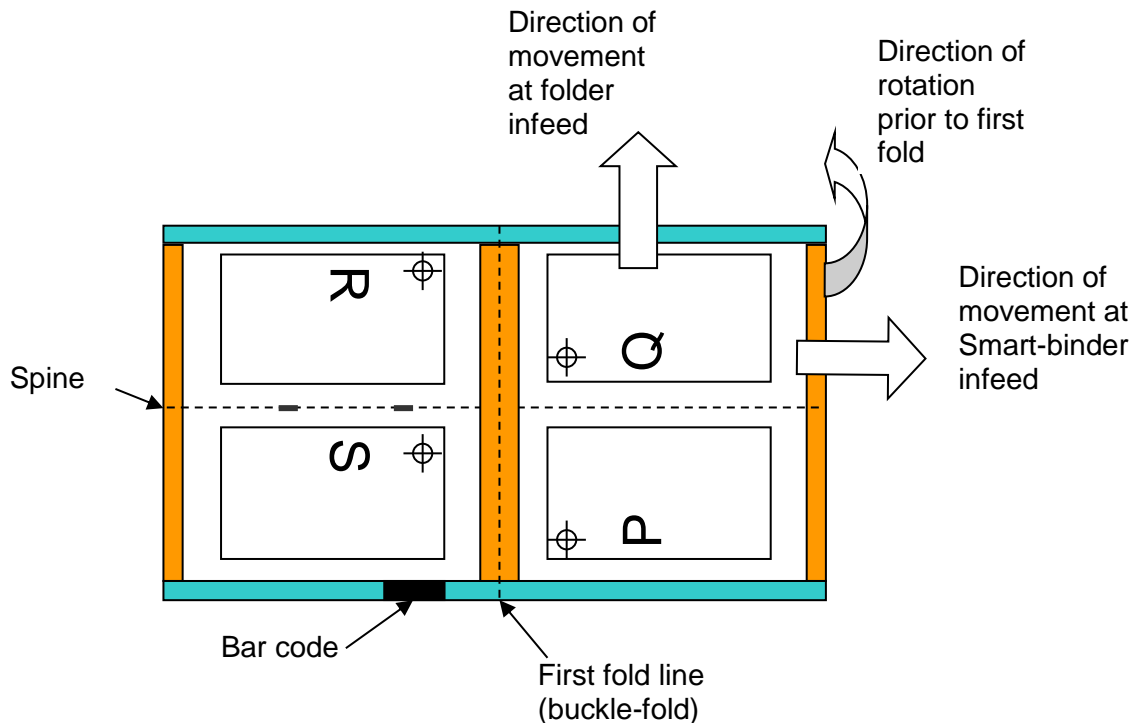
Note: Book 1 (P1 & Q1) is nearest the operator on the delivery conveyor.

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

A5 Portrait (or 8 1/2 x 5 1/2") finished size

To produce smaller sizes books from a full width web using an 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	1/2 letter size 8 1/2 x 5 1/2"
Web Width	430 – 460mm	17 1/2 - 18 1/4"
Sheet cut length	305 – 320mm	11 1/2" – 12 1/2"

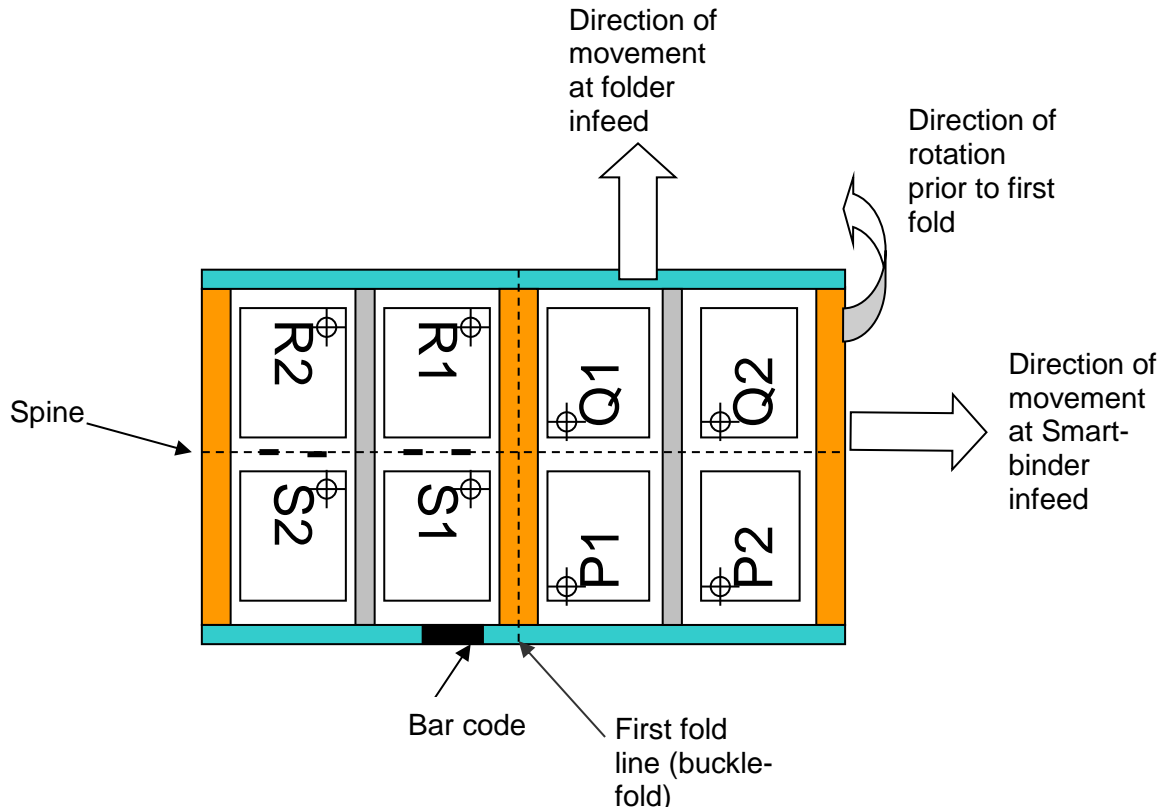


Page Number	Printer 1	Printer 2
P	$4*(n-m)+2$	$4*(n-m)+4$
Q	$4*(n+m)-1$	$4*(n+m)-3$
R	$4*(n+m)-2$	$4*(n+m)$
S	$4*(n-m)+3$	$4*(n-m)+1$

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

A6 Landscape (or 4 1/4" x 5 1/2" oblong) finished size

	A6 size (Landscape) 105 x 148mm	1/4 letter size (oblong) 4 1/4" x 5 1/2"
Web Width	442 – 464mm	18 – 18 1/4"
Sheet cut length	305 – 320mm	11 1/2" – 12 1/2"



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

9.2 **Guide to printing bar codes or 2D Datamatrix codes**

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.

Sheet Number and Number of Sheets

This information is contained in 2 fields of 2 or 3 numeric characters at the start of each code, for example:



This 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.

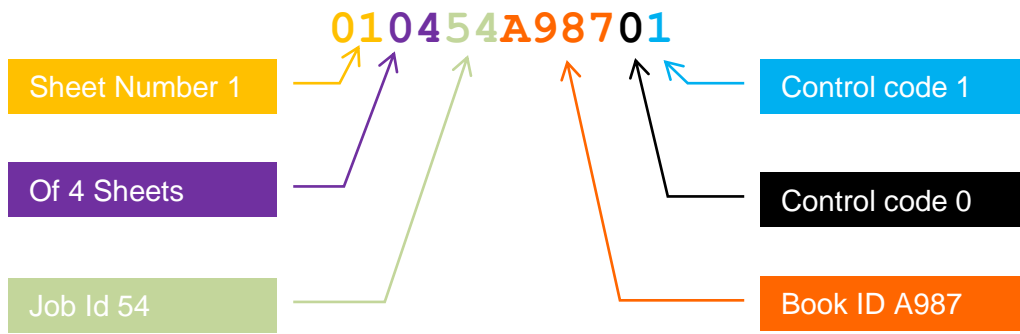
This can be followed by a number of characters (limited by the type of code used, and the capabilities of the code reader) that can be used as:

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.

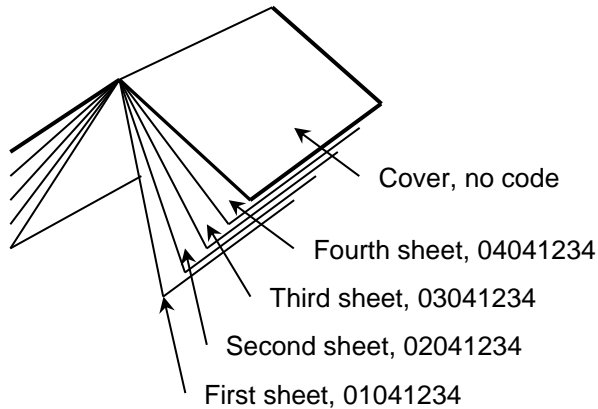
4/ Control codes for the various selective processing functions that the Smart-binder can perform.



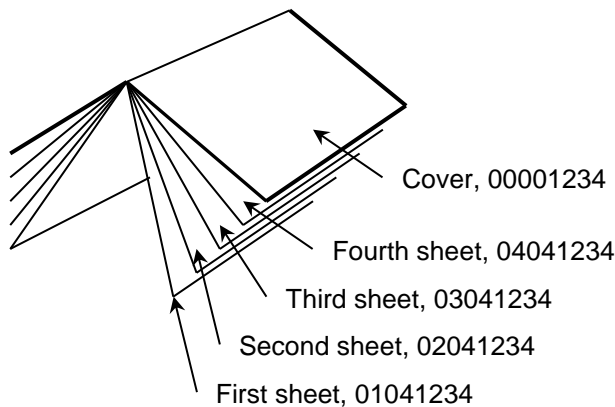
Example of 2 digit coding for saddle-bound books.

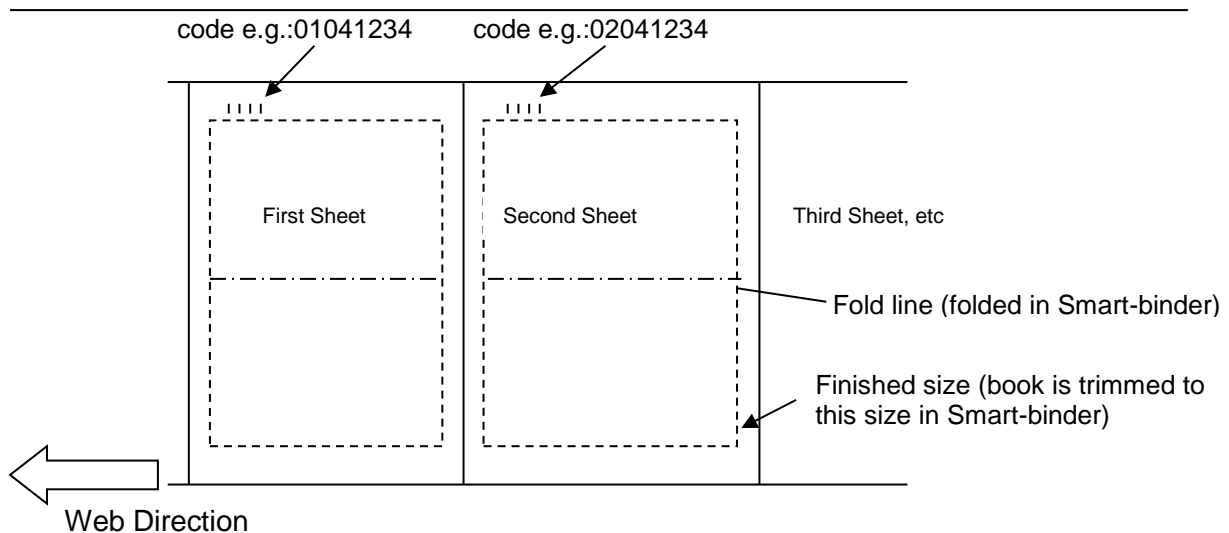
In this example, a “sheet” has 4 printed pages: the 16-page book is made up of 4 sheets of paper. The paper is printed on a web printer running in-line with the Smart-binder. If a separately-fed cover is added, then we describe this as a 16-page book plus cover. A book without a separate cover is usually described as ‘self-cover’.

16-page book, plus non-coded cover



16-page book, plus cover with Book ID





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.

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 unused spaces before the Book ID (either 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.

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

Composition of the fields into codes

The data format must be the same on all sheets in a job.

Sheet Number (SN) & Number of sheets (NN)

Leading 0s must be printed (eg 01) white space is not permitted in or between the sheet number and number of sheets fields.

9.2.1.1 2 digit scheme for saddle binding

SN, in the range 01..NN, followed by NN, in the range 01..50. Optionally followed by 'CC' , 'BID' and 'JOB' in any order.

9.2.1.2 3 digit scheme for perfect binding.

Typically used when perfect binding single sheets or once folded sheets from cut-sheet printers. Not available in saddlebinding machines.

SN, in the range 001..NN, followed by NN, in the range 001..999. Optionally followed by CC, 'BID' and 'JOB' in any order.

9.2.1.3 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 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 followed 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.

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 – 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.

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 Smart-binder from a Pile feeder.

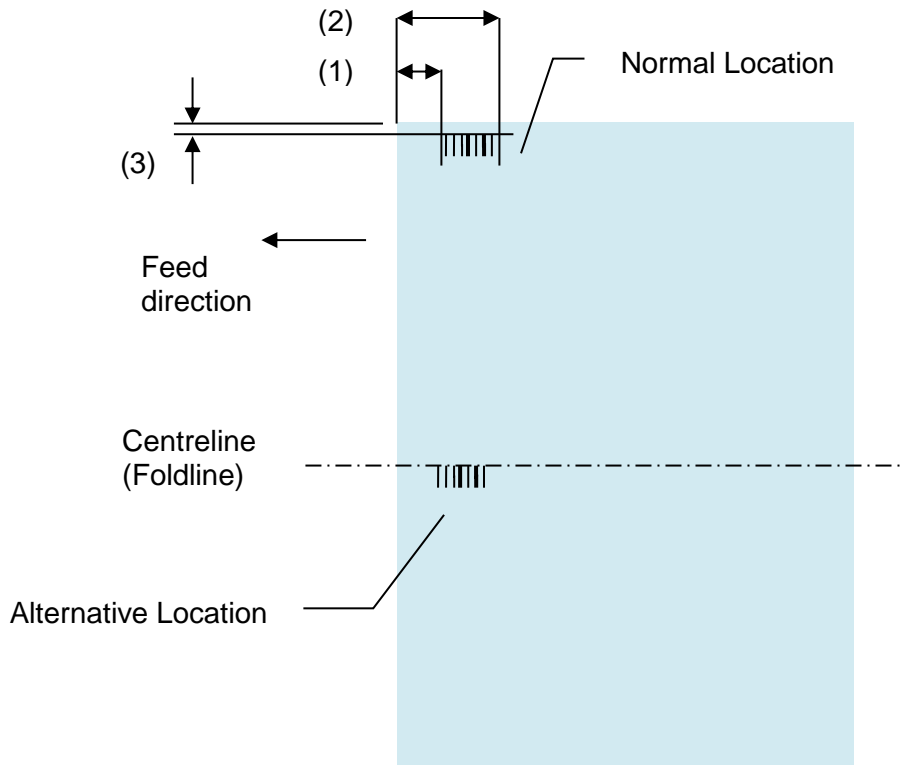
The generic Book ID feature cannot be used with ITF barcodes as they do not provide the '*' character. Use 2D codes, CODE39 or CODE128.

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.

Where to print the code

9.2.1.4 When reading on the infeed of the Smart-binder



For inline operation with cutters (see Appendix 4 for position of code on Smartbinders up to serial #145).

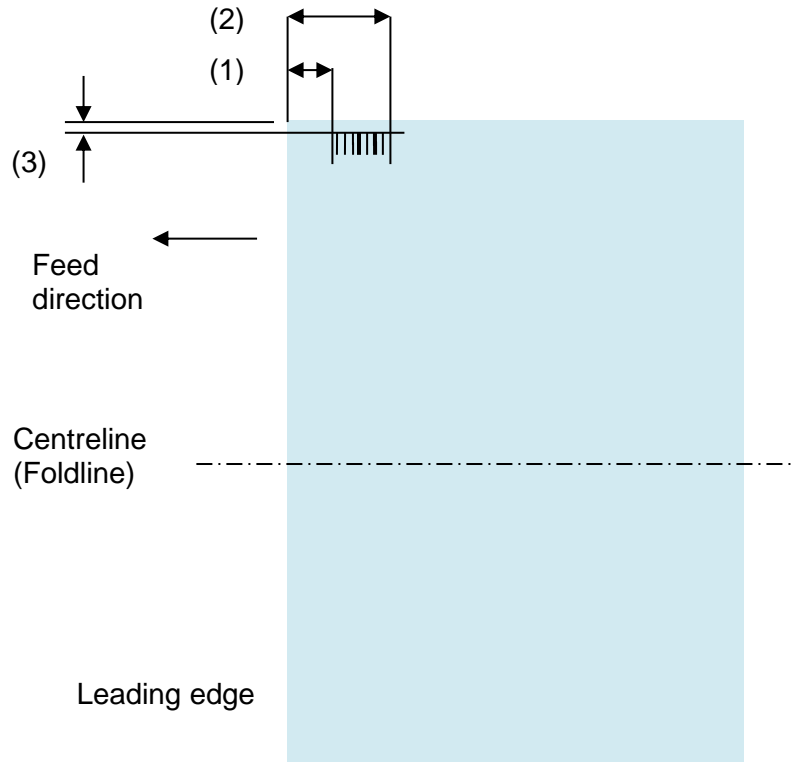
Dimension	Linear code	2D code
(1) Minimum distance from leading edge of sheet	110mm (4.3")	110mm (4.3")
(2) Maximum distance from leading edge of sheet	Up to trailing edge of sheet	140mm (5.5")
(3) Minimum distance from side of sheet	Can be printed to edge of sheet	Quiet zone defined for code (see 4.2)
Minimum width	Depends on reader (see 4.1)	

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)	

9.2.1.5 When reading the code in a sheet pile feeder

Applies to options: SB-095 (off-line operation) or SB-097.

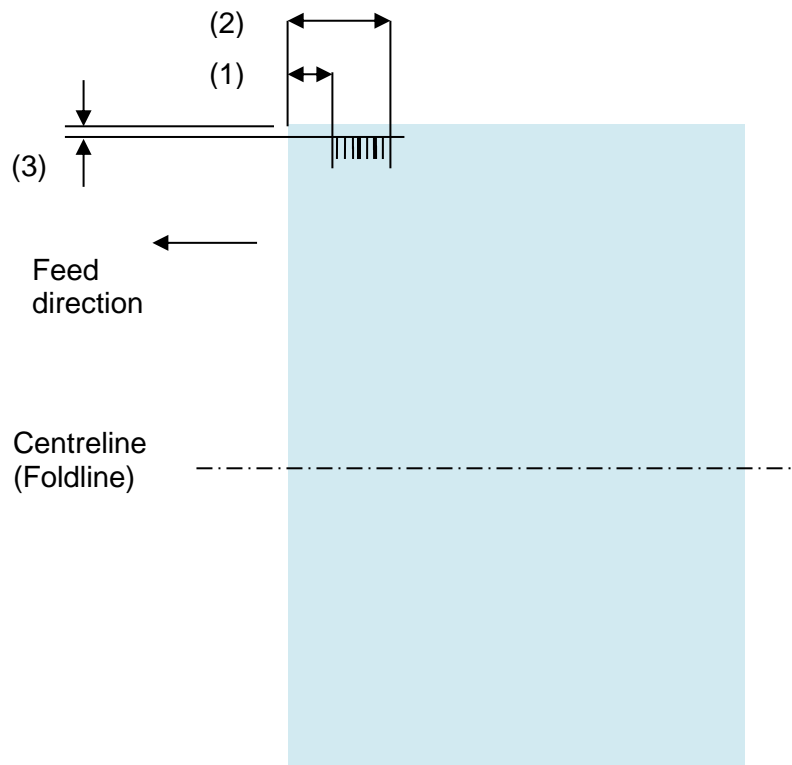


Dimension	Linear code	2D code
(1) Minimum distance from leading edge of sheet	80mm (3.15")	80mm (3.15")
(2) Maximum distance from leading edge of sheet	Up to trailing edge of sheet	Up to trailing edge of sheet
(3) Minimum distance from side of sheet	2mm (0.1") ⁽¹⁾	2mm (0.1") ⁽¹⁾
Minimum width	Depends on reader (see 4.1)	

⁽¹⁾ Codes must be printed away from the edge of the sheet because the sheet moves slightly as it is picked up by the separator and this can expose the code on the sheet below, this can prevent the reader from decoding the code on the top sheet.

The range of positions for the code is restricted by various parts of the feeder which obscure parts of the sheet.

9.2.1.6 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 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)	

Code types

9.2.1.7 Linear codes

ITF – Industrial 2of5, numeric characters only (0-9), digits are encoded in pairs so there must be an even number of them.

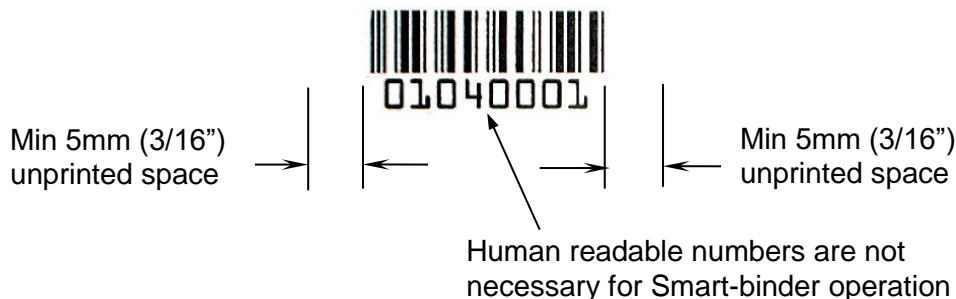
CODE39 – alphanumeric characters, however, it takes up more space because it encodes more characters.

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 (1 $\frac{1}{8}$ ") 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.

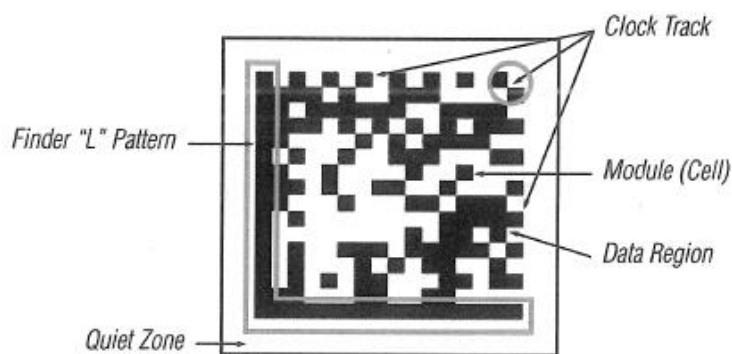
9.2.1.8 2D Codes

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

QR – similar to Datamatrix, 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 of Datamatrix 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 than 10mm square in order to meet the minimum cell size needed to read the moving code.

Selecting the appropriate code reader

Code	BL180	MS3	Quadrus mini velocity	Quadrus mini 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.

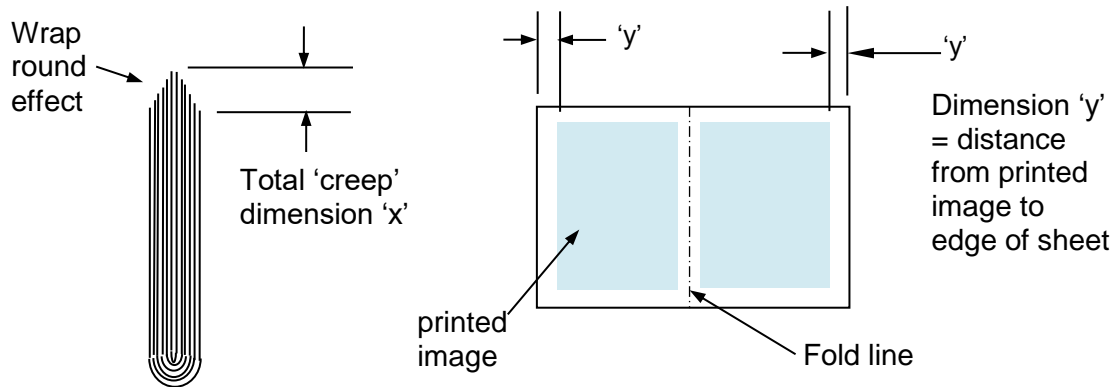
MS3 Laser reader, fitted as standard to new Smart-binders from 2014 on, will read codes of up to about 16 characters at web speeds up to 150m/min.

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 from 2014, will read on web speeds up to 150m/min.

– Image creep (appendix 1)

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 imposing 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 imposing 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.

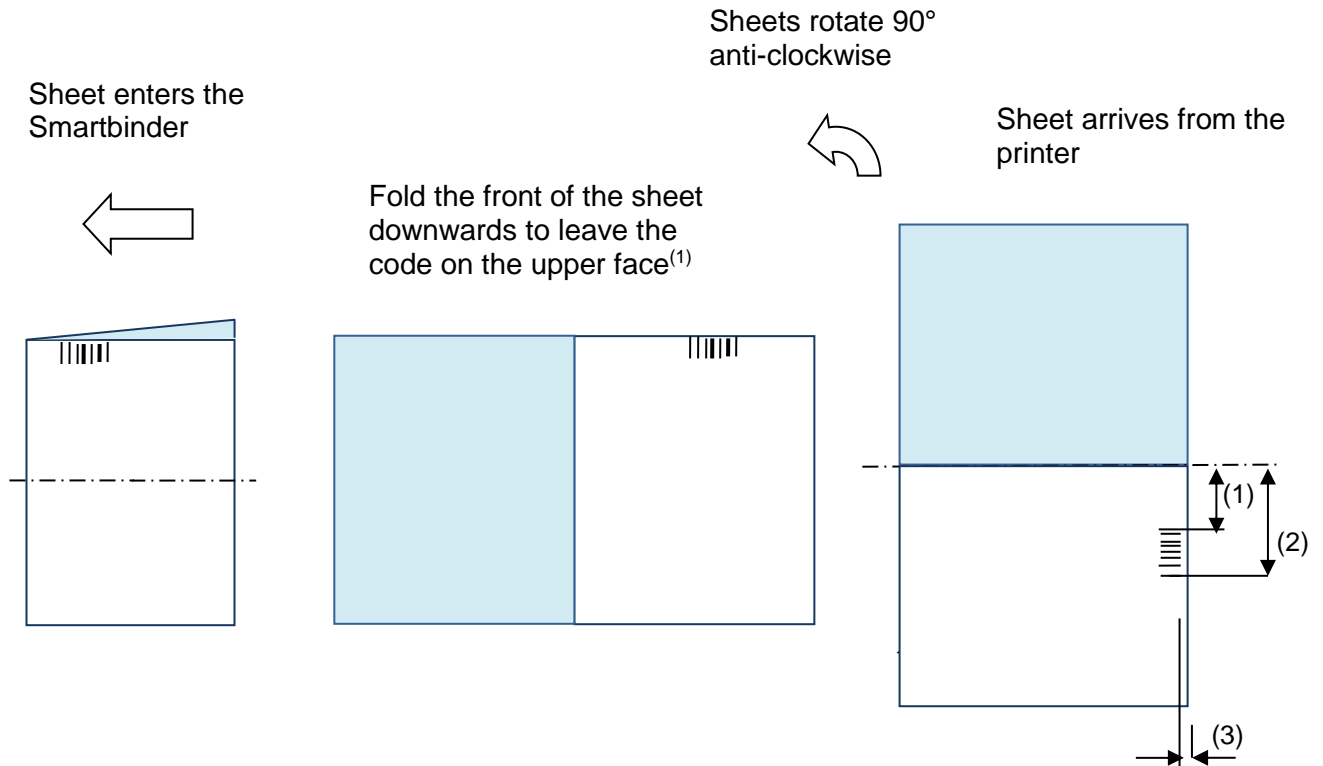
If a separate cover is used, its page layout should be arranged to align with the outer sheet.

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)

Code positions when rotating and folding sheets in the RF100 (appendix 2)

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	110mm (4.3")	110mm (4.3")
(2) Maximum distance from centreline of sheet	Up to trailing edge of sheet	140mm (5.5")
(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)	

Control codes for 4 Perforator Heads (appendix 3)

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 1 st digit	CC 2 nd 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**

Position of codes for operation inline (older machines). (appendix 4)

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)	

10 Using the Smart-binder

10.1 *Operating the Smart-binder*

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 about 15-20 sheets, 60-80 pages), 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.

The optional ASA-100 automatic stitch adjust system is available if large changes in book thickness must be made on-the-run.

Format changes

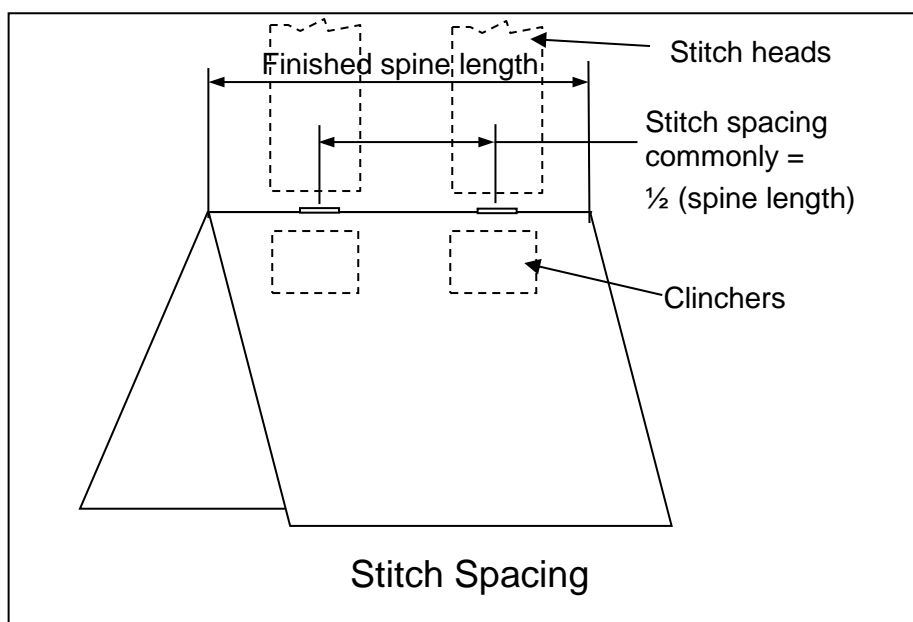
Small format size changes may be made without changing the position of the stitching heads. In this case the changeover may be made in about 5 minutes.

For larger format changes, where the stitch positions need to be moved, changeover time will increase 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.

Stitch Spacing, standard Stitching (not loop stitching).



“Normal” stitch spacing with 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

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.)

10.1.1.1 Notes on stitch spacing

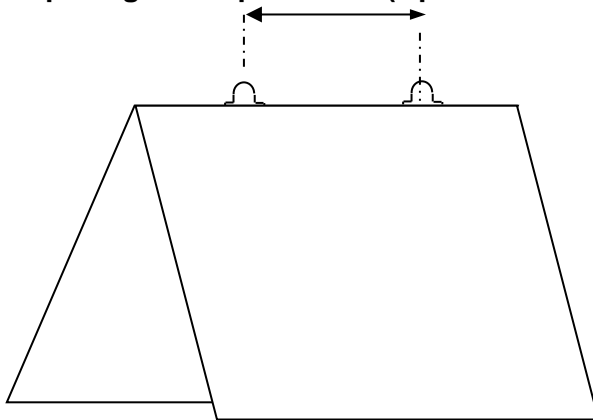
- Generally users will want stitches at “normal” stitch spacing (see table above) or slightly greater spacing. It is not usually desirable to have stitches closer together than the “normal” distance.
- It is not usual for users to insist on precise stitch spacing – except where loop stitches are used.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

10.1.1.2 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 of Loop Stitches (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.

10.1.1.3 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.

Using the Cover/Insert Feeder option CIF-102

The Cover Feeder for saddle-bound books can be loaded with up to approximately 100 covers (depending on stock weight). 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 from the CIF-102, 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) in order 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.

Working with Paper rolls, or stacks of sheets

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.

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.

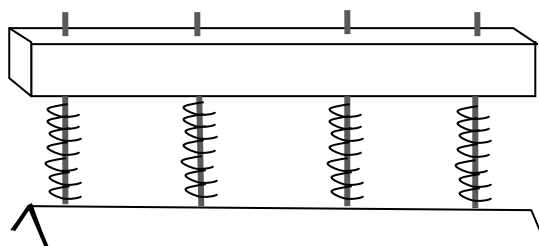
Toner should be properly fused to all digitally printed sheets. If not, it will transfer from the paper onto parts of the Smart-binder and cause book marking. If toner does transfer to Smart-binder guides or belts, clean them using a cloth soaked in alcohol, or soap and water.

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.

Changing between wire stitching and ISG cold-gluing

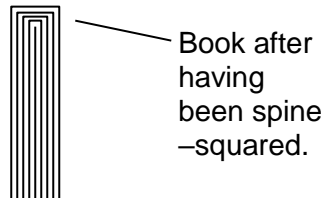
(SB-1G, SB1-G4, SB-3 and SB-4 only)

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'.



Using the optional 'Spine-squaring' unit SM-101

The SM-101 takes ISG glued or saddle-stitched booklets and presses their spines into a square shape. The quality of spine squaring is reduced when the books are very thick (for this reason, spine squaring is recommended only for books up to about 3mm thick).



Book after having been spine-squared.

With the SB-1, SB-2 or SB-3, the Spine-squarer SM-101 may be easily connected to the end of the 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.

10.2 *Maintaining the Smart-binder*

Spare Parts

10.2.1.1 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)

10.2.1.2 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.

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.

Smart-binder ‘Consumables’

10.2.1.3 Stitching Wire

Two 2.5kg (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.

10.2.1.4 Glue

10.2.1.4.1 ISG cold glue

The Smart-binder SB-1G, 1G4, 3, 4 and 5 systems are supplied with 5 litres of cold glue, which is sufficient for the normal machine commissioning period. Refer to IBIS for recommended glue to be used in the ISG system. **It is essential that only the correct (IBIS -specified) ISG glue is 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 .
- glue consumption is increased if choosing to apply a continuous line of glue instead of ‘dots’ spaced apart from each other (sometimes selected when gluing a glossy coated cover). *Note: normal monochrome-printed absorbent papers require only ‘dots’ of glue spaced about 4 - 8 mm apart.*

10.2.1.4.2 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) 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:

Number of sheets in booklet	Number of pages in booklet	Cost of ISG (GB Pounds)
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 Eukalin)

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 stapling system. Also, ISG glued booklets are stronger and lay flatter than wire stapled booklets

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

The Sprint-binders are supplied with a small amount of hot melt glue in the glue tank, sufficient for normal commissioning. Refer to IBIS for recommended glue.

10.2.1.5 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 consists of a special shear knife, with two cutting edges, and a pair of bed knives (see section 6.10). As with the main 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 if 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 blades
SB-032	Trimmer knives (1 upper and 1 lower).
SB-034	Center knives (1 upper and 2 lower)

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

Log files

These can be found in the Smart-binder PC controller C:\temp directory. 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

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:) in order 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.

Note that because the Smartbinder runs this stripped out version of XP there is no firewall, and it is not possible to run anti-virus software on it. Thus there is potential for security issues (e.g. introducing a virus from a USB stick plugged into the machine) and steps should therefore be taken to limit the network access to and from the machine.

See IBIS document S:\Mark\Sst_design\vb\descriptive documents\Smartbinder_Diagnostics_005.doc **for further info**

11 Planning an installation (SB-1, 2 and 3)

When planning installation and commissioning, allow 2 days to install the Smart-binder and 8 days for system commissioning and operator training, prior to the start of live production. Allow some extra days for commissioning systems which include optional modules such as F-100, RF-100 and SB-096, or when installing the extra modules associated with the SB-4 system.

11.1 *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.

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

Access:

Ensure that there is sufficient space to manoeuvre the largest Smart-binder module into the final position (see 9.10.4 for dimensions of largest module). This is particularly important where this unit must pass through doorways.

Floor:

The machine should be sited on a substantial floor, which is level over the total area of the machine to within 10mm (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.

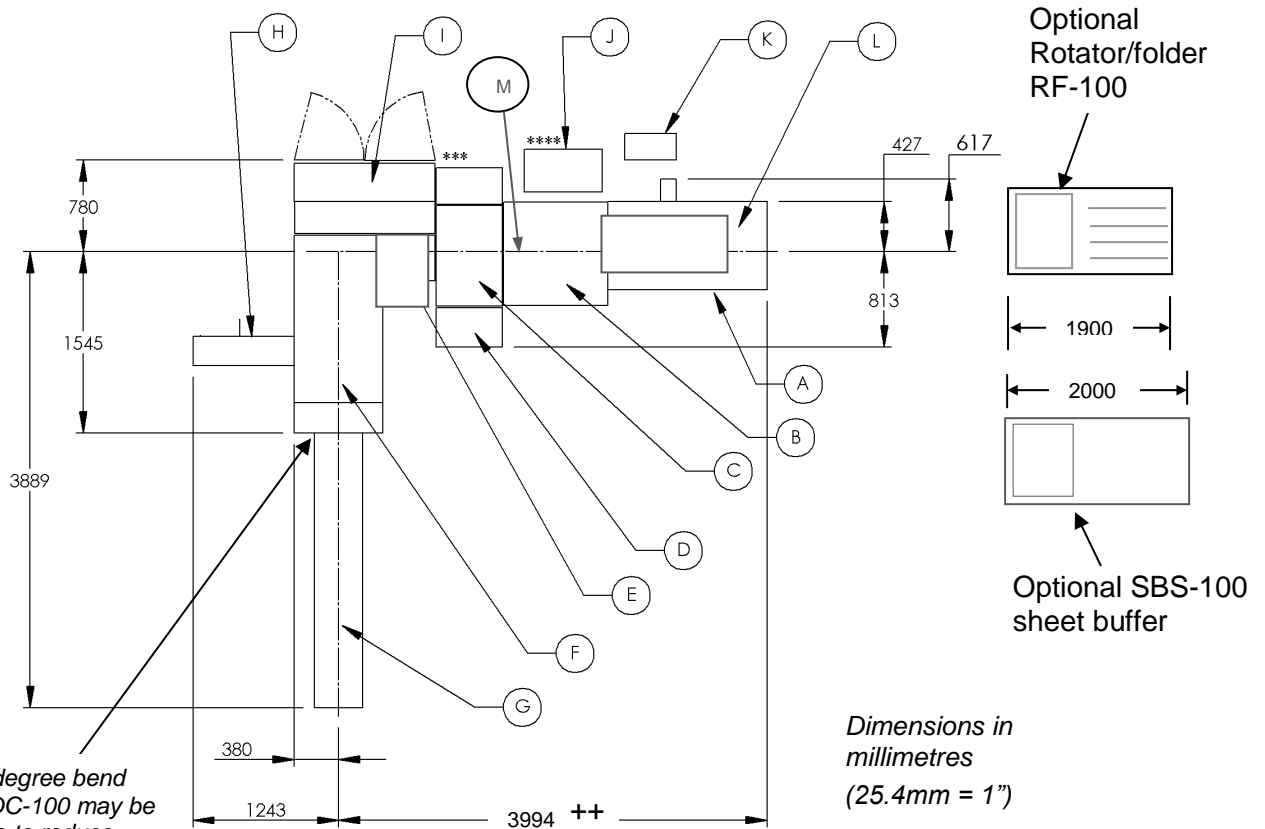
Space around the machine: Allow adequate space for:

- All the doors and guards to be fully opened.
- 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.
- Emptying the trimmer waste collection bin, if the removal conveyor is used.
- Customer-supplied floor standing Wire Spools (15kg and 100kg spools mount on the floor behind the Stitcher, the 2.5kg spools supplied by IBIS mount on the machine).
- The vacuum pump(s), transformer and interface unit for pile feeders.

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

11.3 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	G	Delivery conveyor
B	Scoring and folding	H	Trimmer waste conveyor (optional)
C	Collator	I	Electrical enclosure
D	Operator interface	J	Transformer (optional) <i>(optional.. needed only for input voltages outside the 380 – 415v range)</i>
E	Stitcher	K	Vacuum pump
		L	Cover feeder (optional)
F	Trimmer	M	ISG Gluing (SB-3 only) +++

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.

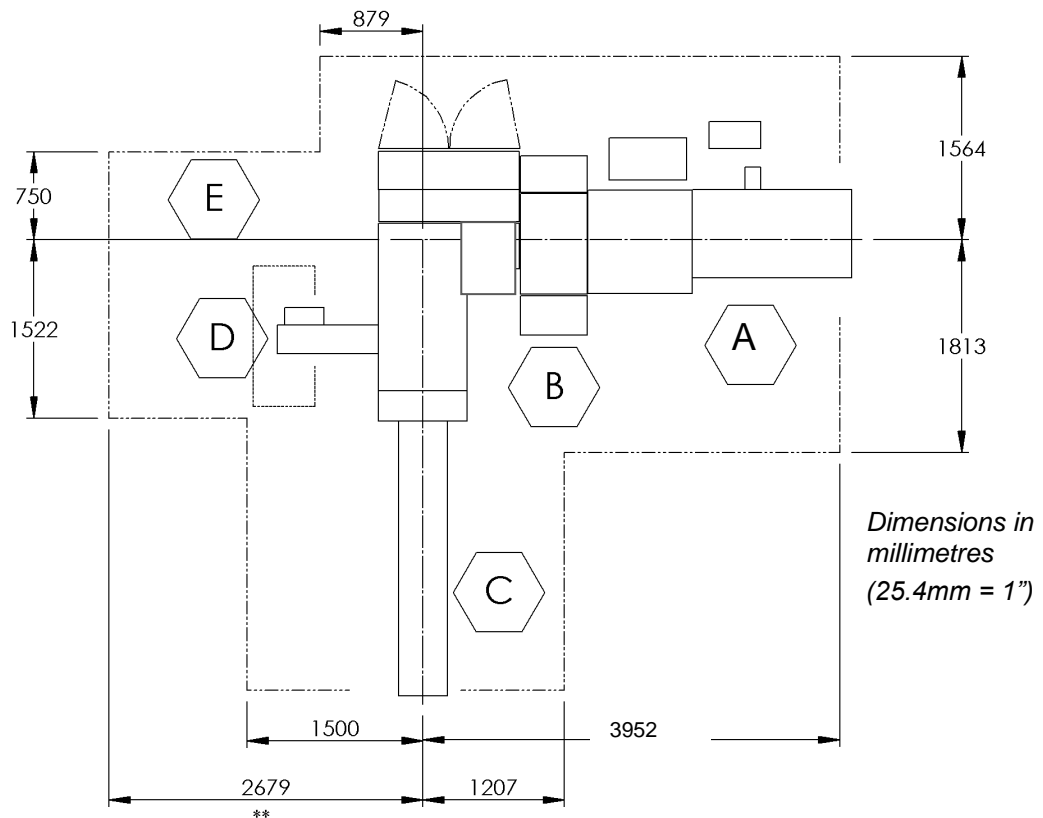
*** Electrical supply position. 3 metre cable and plug supplied, so customer's power socket must be within 3 metres of this point.

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

++ This dimension increases by 330mm when reciprocating cutter interface conveyor is used (option SB-092), or when the Dynamic Perforator (option DMP-100) is fitted.

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

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

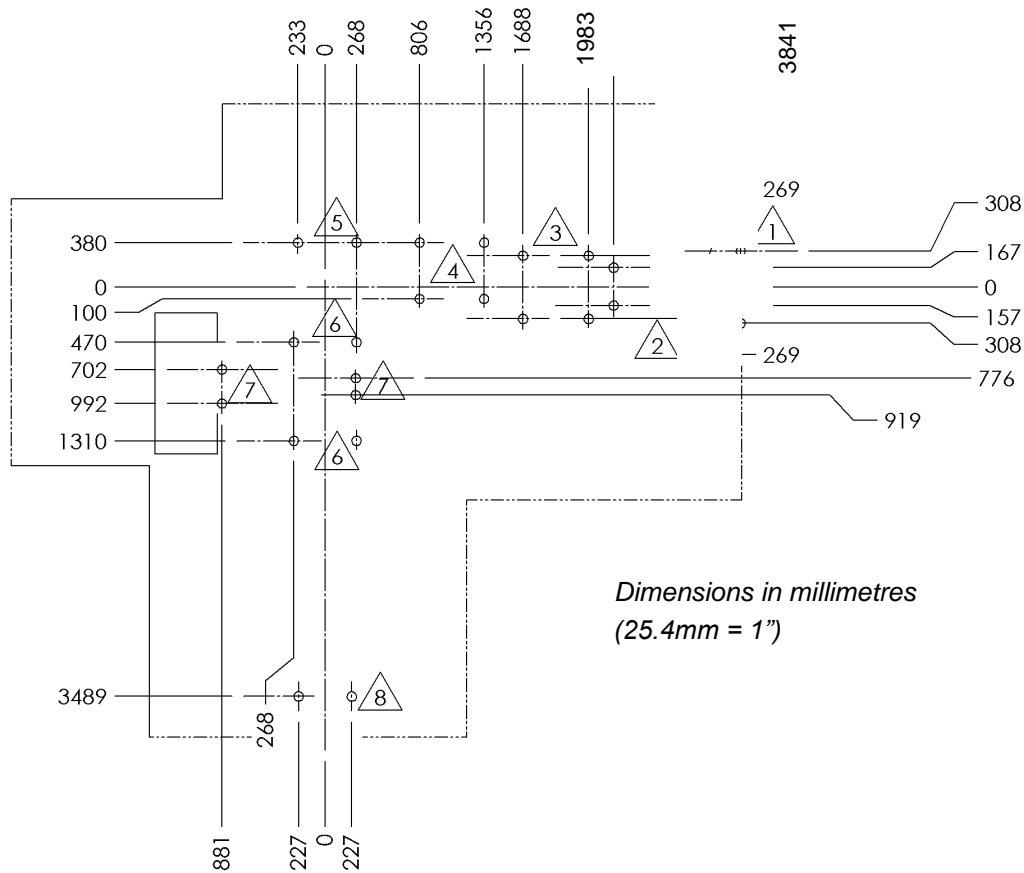


The area within the chain dotted line must be clear of fixed obstructions to allow operator and service access to the machine.

- 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)

** This dimension gives space to remove saddle skirts. It can be reduced to 1900 mm, but some maintenance operations will be more difficult and take longer to complete.

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.

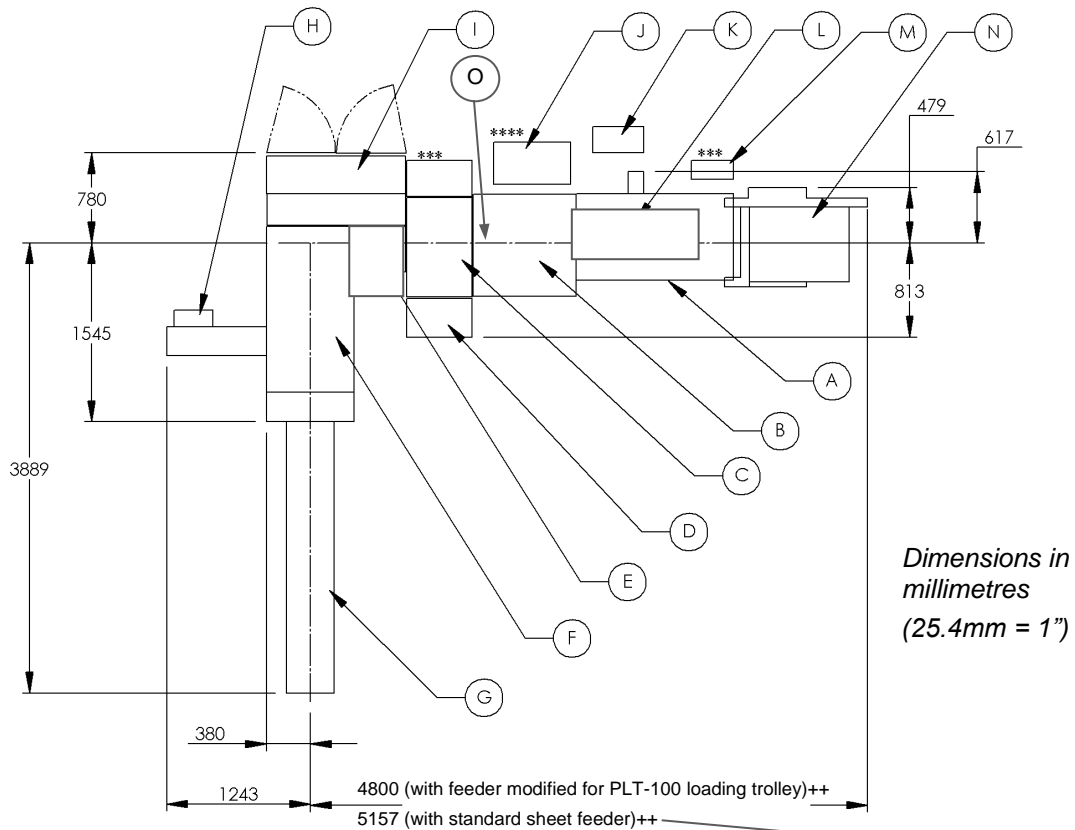
Total machine weight 1900 kg (4200 lb).

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.

11.4 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.



Note: this dimension (5157mm) may be reduced if needed by shortening the sheet feeder pile lift table. Refer to IBIS for details

Smart-binder elements			
A	Infeed conveyor	H	Optional trimmer waste conveyor
B	Scoring and folding	I	Electrical enclosure
C	Collator	J	Transformer <i>(optional.. needed only for input voltages outside the 380 – 415v range)</i>
D	Operator interface	K	Vacuum pump
E	Stitcher	L	Cover feeder
F	Trimmer	M	Pile Feeder Interface Box
G	Delivery conveyor	N	Pile Feeder
		O	ISG gluing (SB-3 only)

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.

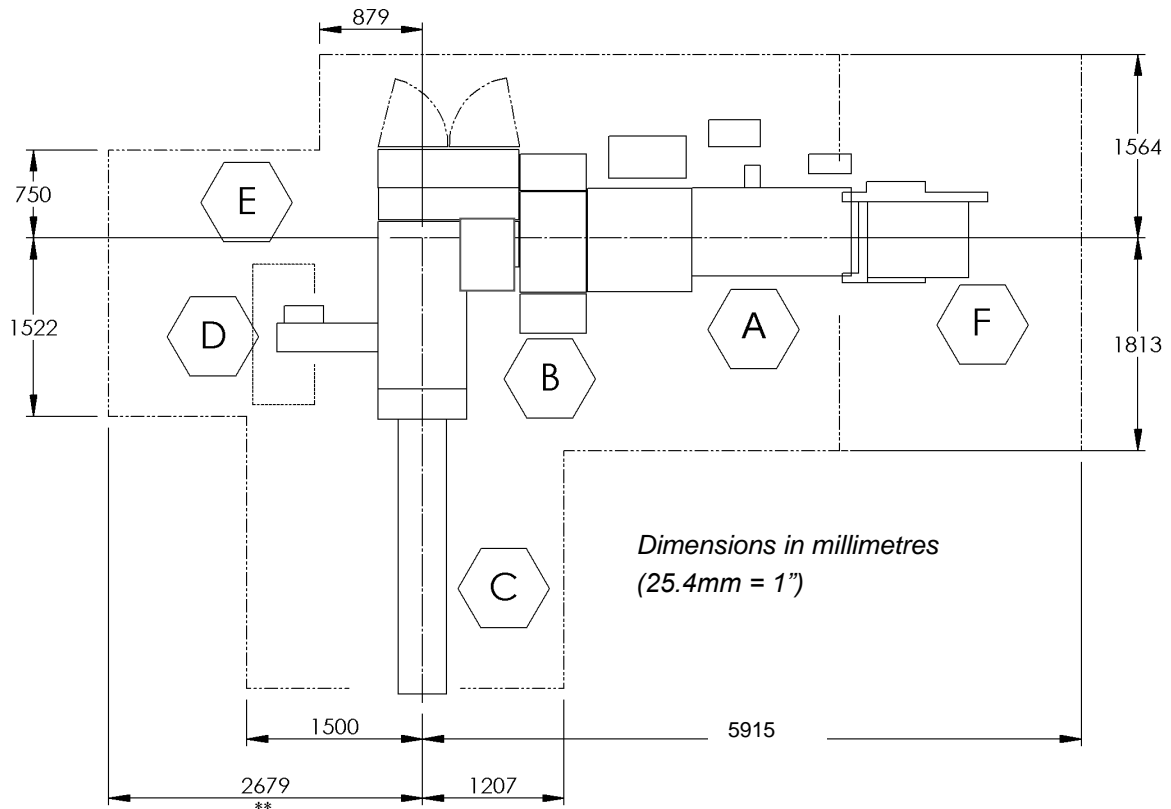
*** Electrical supply positions (one for main Smart-binder, one for pile feeder). 3 metre cables and plugs supplied so customer's power sockets must be within 3 metres of these points.

**** 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 reciprocating cutter interface conveyor is used (Option SB2-092), or when the DMP-100 perforator is fitted.

+++ 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.

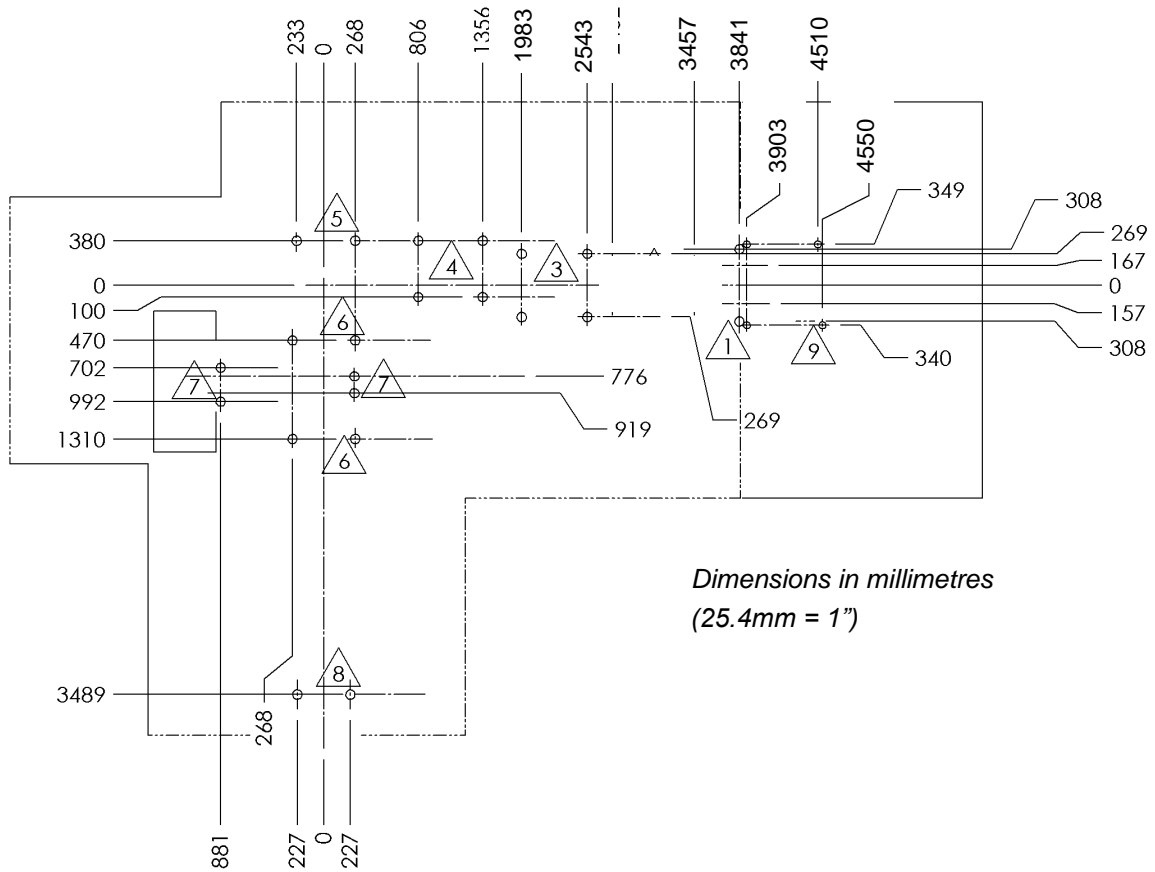


The area within the chain dotted line must be clear of fixed obstructions to allow operator and service access to the machine.

- 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 gives space to remove saddle skirts. It can be reduced to 1900 mm, but some maintenance operations will then be more difficult and take longer to complete.

Plan showing floor loadings of all feet of installed off-line 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
9	4	100 KG 220 lb

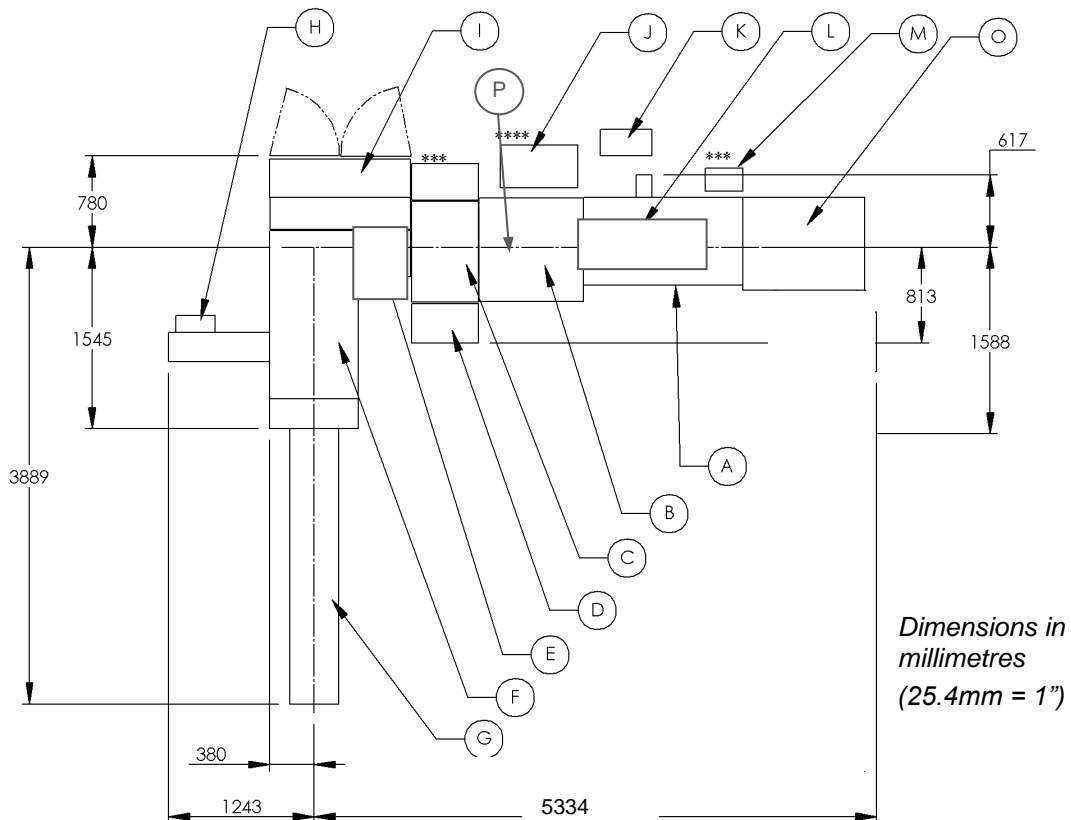
Feet are typically 70 mm (2.75") diameter. Actual loads on each foot are usually much lower, but floor must be able to withstand the loads in this chart.

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.

11.5 Layout of in-line Smart-binder SB-1, 2 or 3 with optional SB-096 pile feeder on the side



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

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.

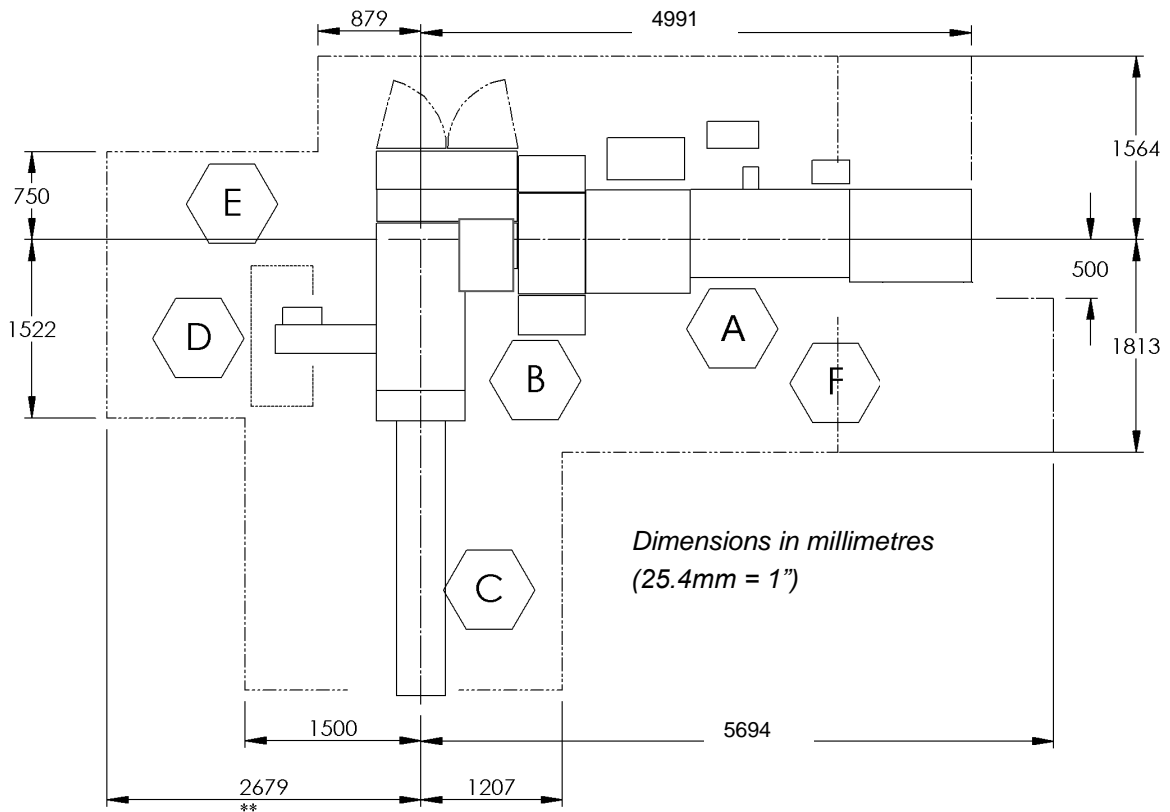
*** Electrical supply positions (one for main Smart-binder, one for pile feeder). 3 metre cables and plugs supplied so customer's power sockets must be within 3 metres of these points.

**** 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 reciprocating cutter interface conveyor is used (Option SB2-092), or when the DMP-100 perforator is fitted.

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

Plan of Smart-binder in-line/off-line (with SB-096) showing clearance needed around machine.

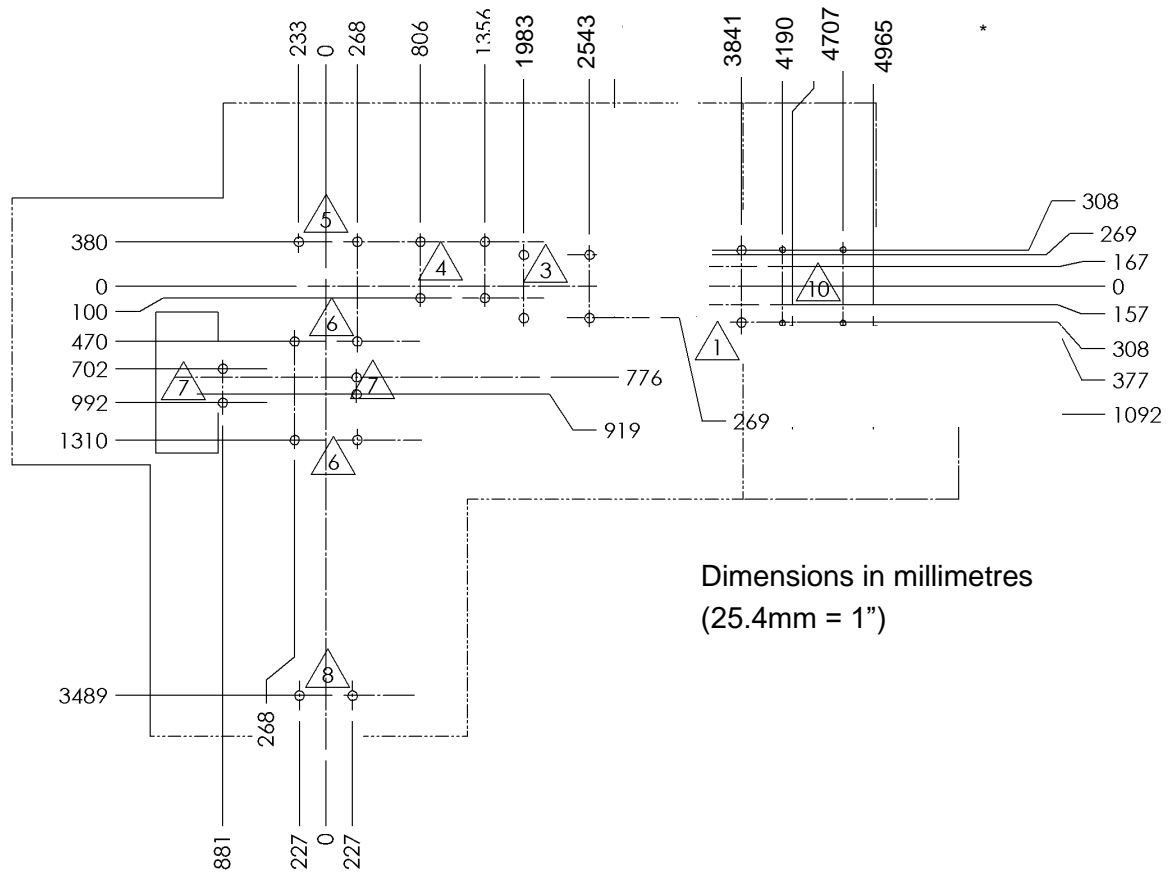


The area within the chain dotted line must be clear of fixed obstructions to allow operator and service access to the machine.

- 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 gives space to remove saddle skirts. It can be reduced to 1900 mm, but some maintenance operations will then be more difficult and take longer to complete.

Plan showing floor loadings of all feet of installed Smart-binder in-line/off-line (with SB-096).



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.

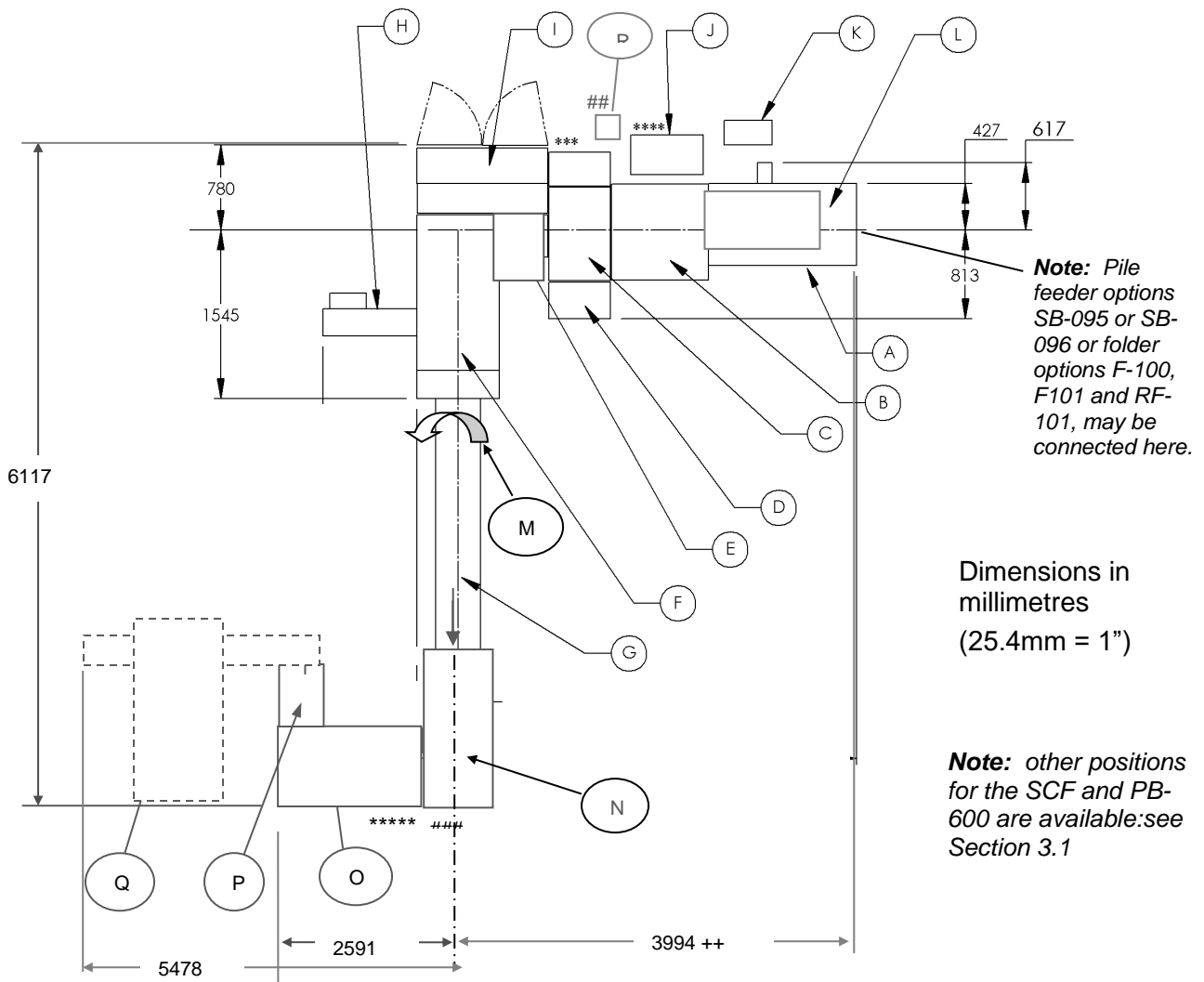
Total machine weight 2100 kg (4600 lb).

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.

11.6 Layout of in-line Smart-binder SB- 4/600 (layout option A)

Note: other positions for the SCF, BB3002 and CMT-130 are available to suit factory space available.



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 or 130 thick-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.

++ This dimension increases by 330mm when Roll Systems Cutter interface conveyor (Option SB2-092) or the DMP-100 dynamic perforator are fitted.

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

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

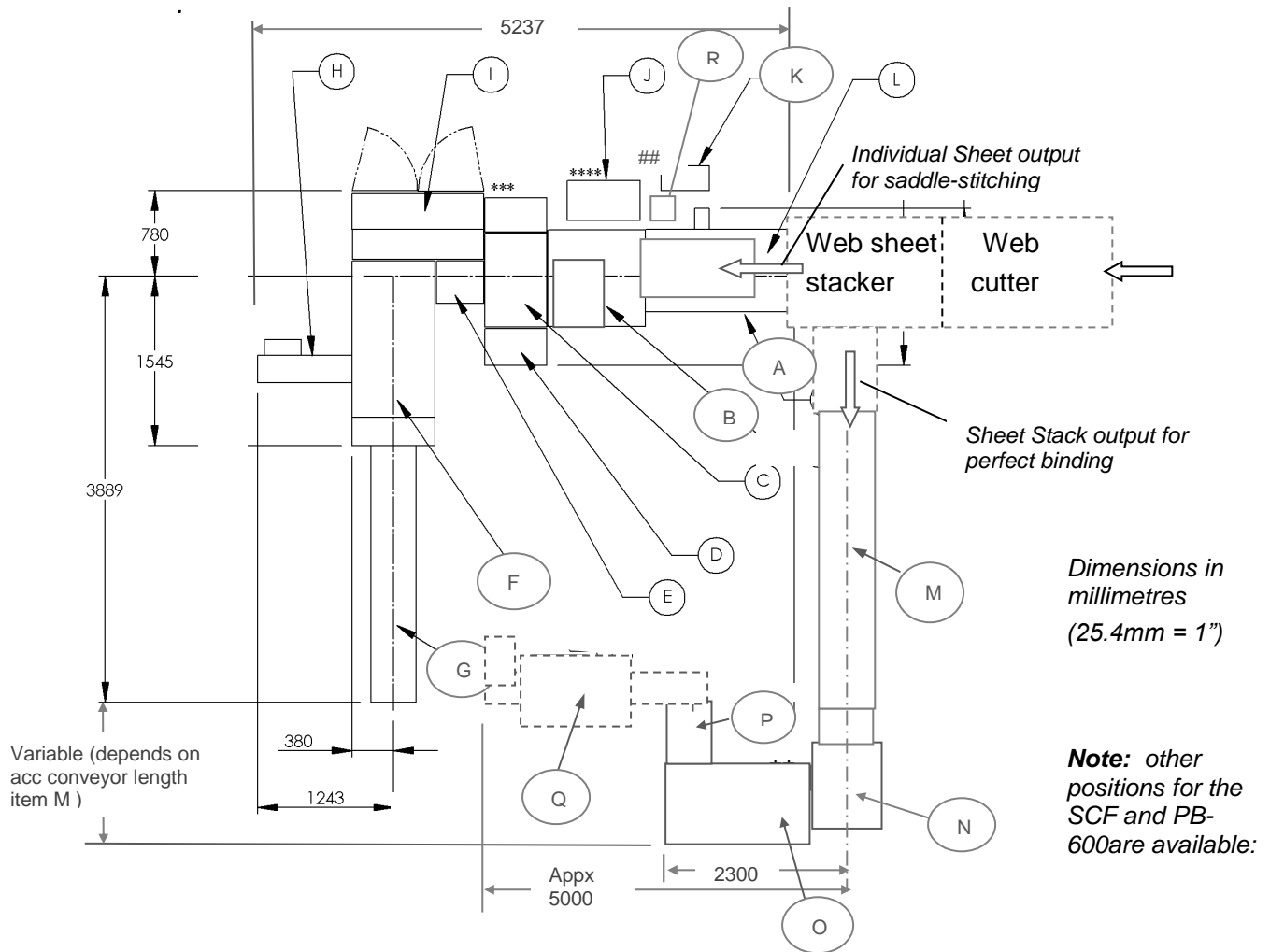
***** Electrical supply for the BB3002

High pressure (filtered) air requirement for ISG gluing

High pressure (filtered) air requirement for the SCF

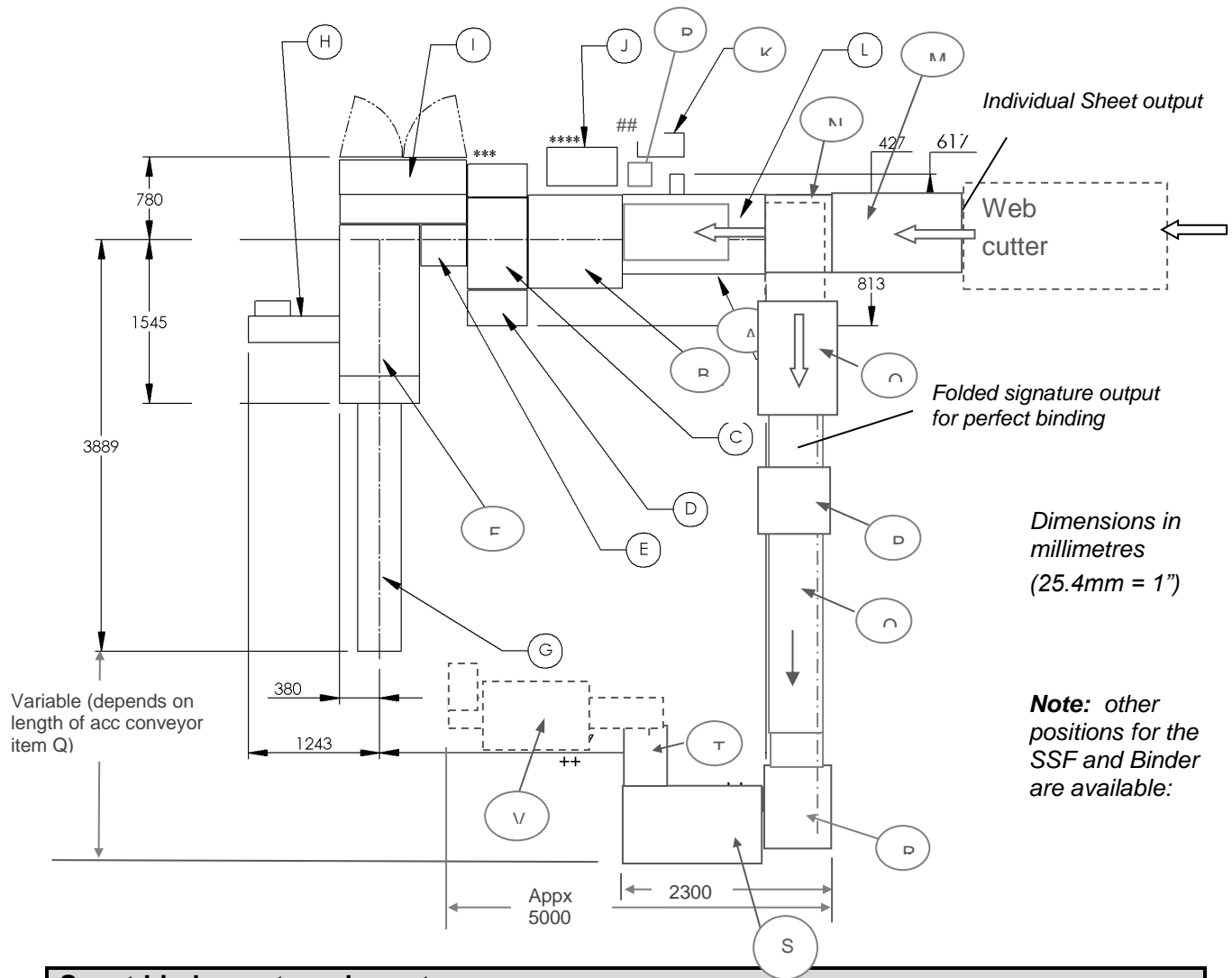
Refer to IBIS for alternative BB3002/ CMT positions.

11.7 Layout of in-line Smart-binder SB-5/600



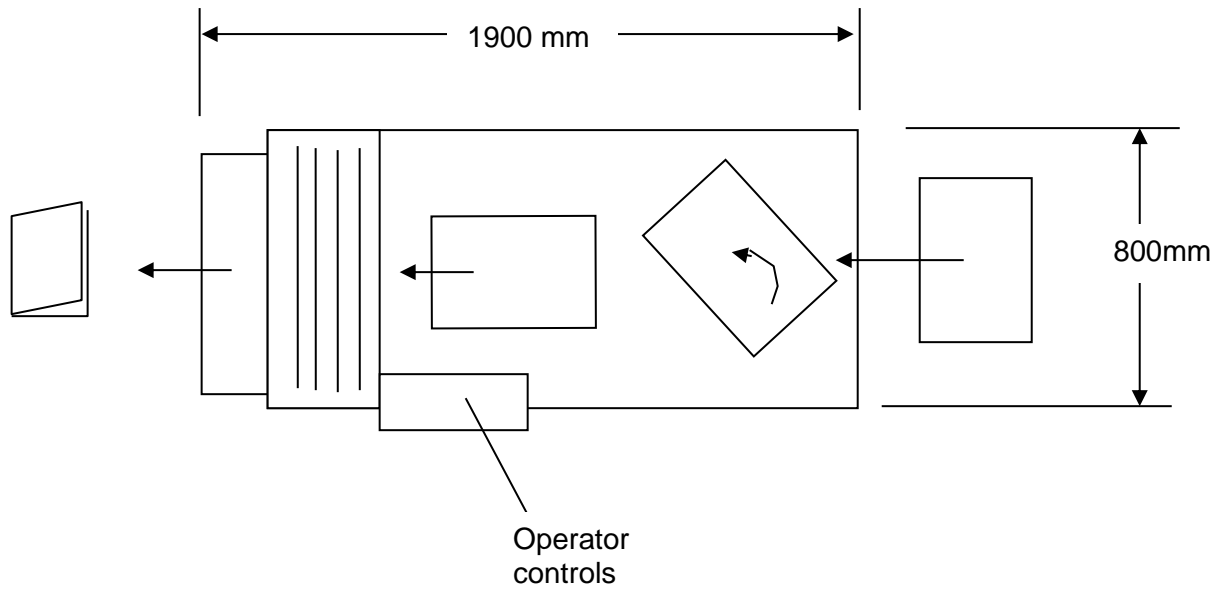
Smart-binder system elements			
A	Infeed conveyor	J	Optional voltage transformer
B	Scoring and folding	K	Cover feeder air pump
C	Sheet collector	L	Smart-binder cover feeder
D	Operator interface (for saddle-stitcher)	M	Accumulator roller conveyor
E	Wire Stitcher	N	SSF (signature set feeder)
F	3-knife 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	R	ISG cold glue reservoir

11.8 Layout of in-line Smart-binder SB-5/600F



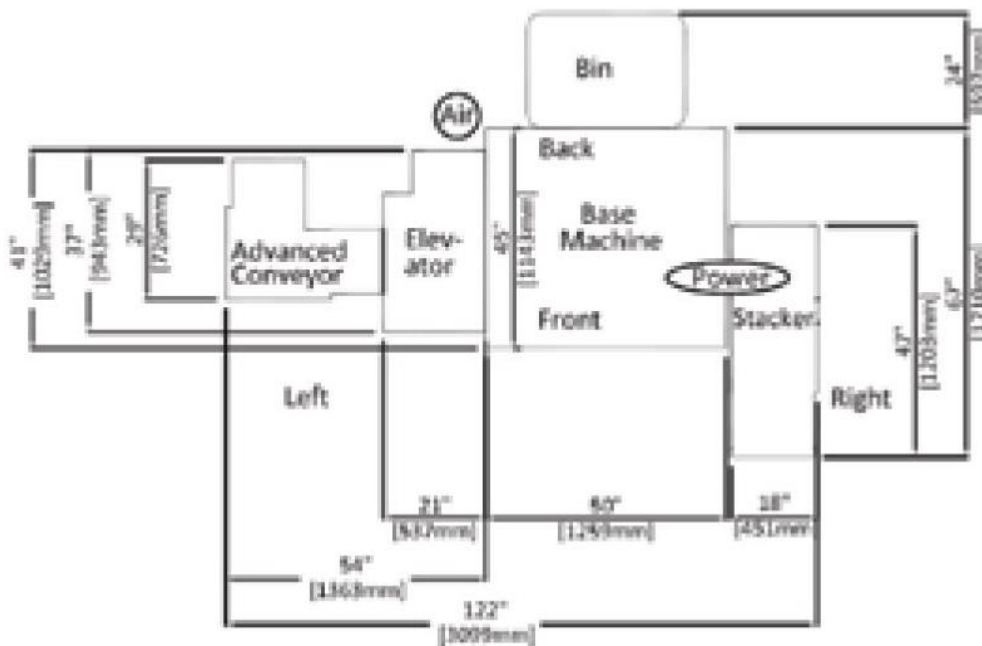
Smart-binder system elements			
A	Infeed conveyor	L	Smart-binder infeed and cover feeder
B	Scoring and folding	M	Folder #1
C	Sheet collector	N	Divert gate and roller table to change sheet direction (for perfect binding)
D	Operator interface (for saddle-stitcher)	O	Folder #2
E	Wire Stitcher	P	Signature stacker (to create book piles)
F	3-knife trimmer (saddle-stitched books only)	Q	Optional accumulator conveyor
G	Delivery conveyor	R	SSF Sheet set feeder
H	Optional trim waste removal conveyor	S	Perfect Binder (PB-600B shown but multi clamp binder also available)
I	Electrical enclosure	T	Cover feeder
J	Optional voltage transformer	V	In-line Book trimmer (CMT-130 shown but other trimmers also available)
K	Cover feeder air pump		

11.9 *Layout of RF-100 rotator/folder option*

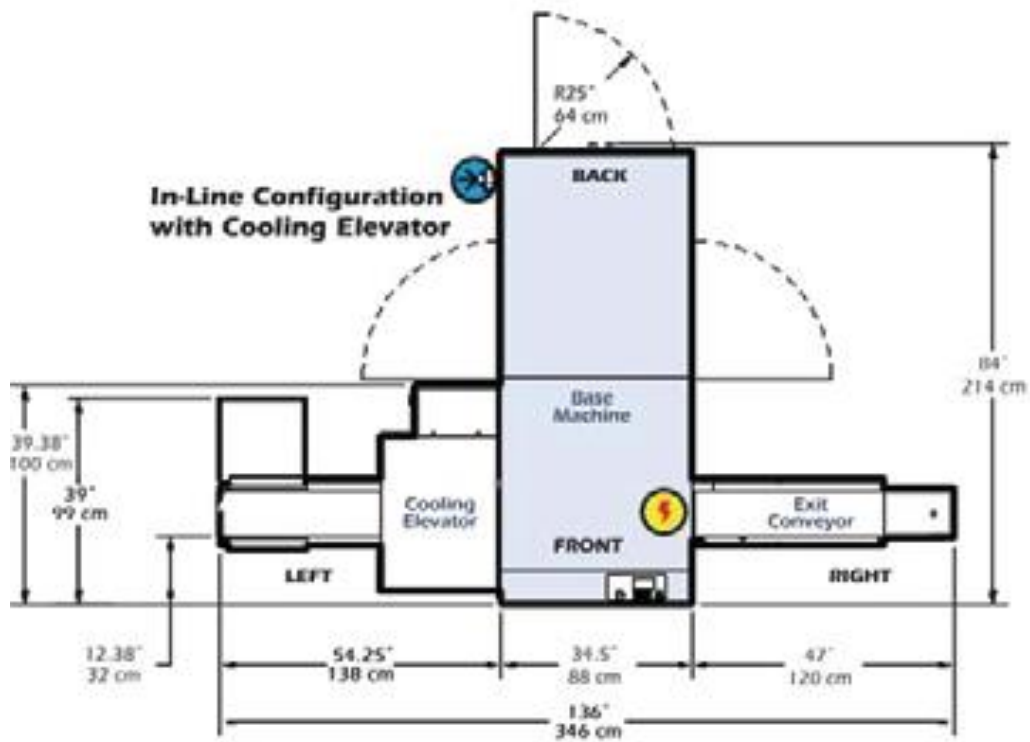


Note: Refer to IBIS for layout dimensions of other optional modules

11.10 *Layout of Optional CMT-130 trimmer*



11.11 *Layout of optional CMT-330 trimmer*



11.12 *Smart-binder Services (power and air supply)*

Electrical power requirements

11.12.1.1 **European voltage range: 3-phase 380-420 volt input supply**

For Smart-binder SB-1, 2 and 3:

380 – 415 Volts, 3 phase and earth, 50Hz, **16 Amp power supply rating**

Additional supply for pile feeder SB-097:

380 – 415 Volts, 3 phase and earth, 50Hz, **10 Amp power supply rating**

Additional supply for RF100 rotator folder

380 – 415 Volts, 3 phase and earth, 50Hz, **16 Amp power supply rating**

11.12.1.2 **USA 3-phase 208 volt input supply to transformer TFR-100 (Note that the transformer increases this voltage to 400V as required by the Smart-binder)***

For Smart-binder SB-1, 2 and 3:

208 Volts, 3 phase and earth, 60 Hz, **30 Amp power supply rating**

Additional supply for pile feeder SB-097:

208 Volts, 3 phase and earth, 60Hz, **15 Amp power supply rating**

Additional supply for RF100 rotator folder:

208 Volts, 3 phase and earth, 60Hz, **30 Amp power supply rating**

**Note: Transformer option TFR-100 is supplied with connection cables to the Smart-binder and may be located anywhere within 3 metres (10ft) of the Smart-binder electrical control box on the back of the machine.*

11.12.1.3 **USA 3-phase 480 volt input supply to transformer TFR-100 (Note that the transformer decreases this voltage to 400V as required by the Smart-binder)***

For Smart-binder SB-1, 2 and 3:

480 Volts, 3 phase and earth, 60 Hz, **15 Amp power supply rating**

Additional supply for pile feeder SB-097:

480 Volts, 3 phase and earth, 60Hz, **10 Amp power supply rating**

Additional supply for RF100 rotator folder:

480 Volts, 3 phase and earth, 60Hz, **15 Amp power supply rating**

**Note: Transformer option TFR-100 is supplied with connection cables to the Smart-binder and may be located anywhere within 3 metres (10ft) of the Smart-binder electrical control box on the back of the machine.*

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

Consult IBIS for power requirement of other optional modules (such as perfect binder etc).

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.

11.12.1.4 Tabulated summary of Electrical power supplies and heat output (assuming 400V 3phase and 220V 1 phase available from factory supply or transformer).

Device	Supply Sockets	Type of connection	Phase	Voltage	Rated Amps	KW	KVA	Heat out KBT U/hr
Smart binder SB3	3 PH+N 16 A	Industrial	3+N	400	16	6.7 (max)	6.7 (max)	23
RF-100 Rotator Folder	3 PH 16 A	Industrial	3	400	16	1.5 (max)	1.5 (max)	
SB-095 or SB-097 Sheet Pile Feeder	3 PH 16 A	Industrial	3	400	1	0.3		
SCF-100	1 PH 10A	IEC	1	220	10	2.2 (max)	2.2 (max)	7.5
PB-600B Perfect Binder	3 PH+N 16 A	Industrial	3	400	12	5.5 (max)	5.5 (max)	13.648
CMT 130 3-Knife Trimmer	3 PH 16 A	Industrial	3	400	12	10 (max)	10 (max)	34
F-100 folder	3 PH 16 A	Industrial	3	400	10	0.9+0.9	1.8	6
BSS-11 Stacker	3 PH 16A	Industrial	2	208-460		1.5KW	1.5 (max)	

Compressed air supply requirements

SB-1 and SB-2: No external air supply is required for normal operation.

SB-3 and SB-4B: High pressure (filtered) air is required for **ISG gluing**: This must be a regulated air supply between 4 and 5 bar pressure (60 – 77 psi). The ISG glue system uses a negligible volume of air (approx 5 litres in 24 hours).

PB-600B perfect binder : High pressure (filtered) air requirement for the **SCF**: minimum 5 bar (77 psi) pressure. At maximum speed the SCF uses 20 litres/min of air measured at STP (eg standard temperature and atmospheric pressure).

If the optional **CMT-330** (or **CMT-130**) book trimmer is selected then this requires 198 Litres/min (7 cfm) air supply at minimum 5- 5.8 bar (70- 90 psi)

Note: CMT trimmer requires 70-90 PSI regulated, dry, non-lubricated compressed air at a minimum of 8 cubic feet per minute (at 70-90 PSI). 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.

Air conditioning

The 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 25°C (64 and 77°F)**

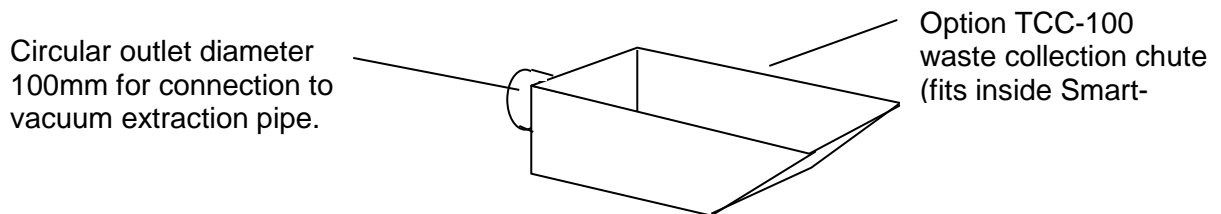
Radiant heat output

Heat output from the Smart-binder is 5 kW (17070 BTU/hour) when running and 0.5 kW (1707 BTU/hour) when powered on but idle.

Heat output from the BB3002 binder (SB-4 only) is 13648 BTU/hour.

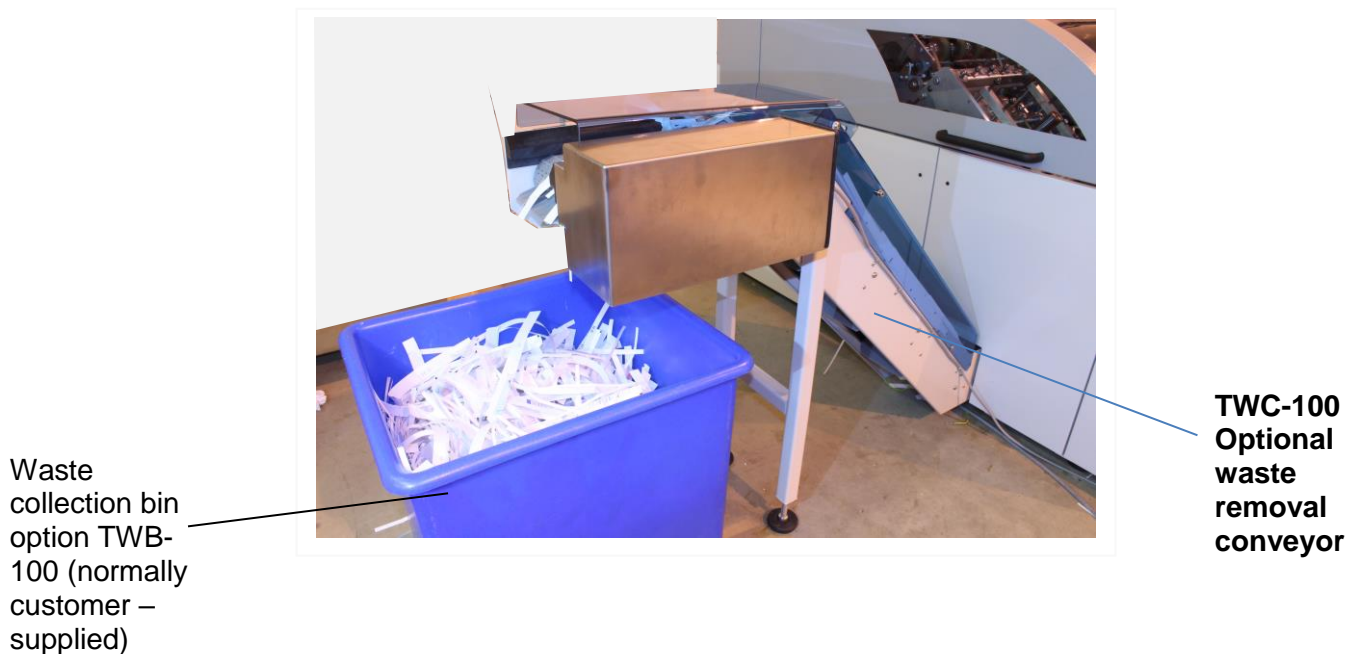
Trimmer waste (trim-off) removal systems

On sites with vacuum or pneumatic extraction systems for waste paper this service can be used to remove waste paper from the Smart-binder trimmer. The optional Smart-binder trimmer waste collection chute TCC-100 (part B0001944) may be supplied to connect to the external extraction pipe.



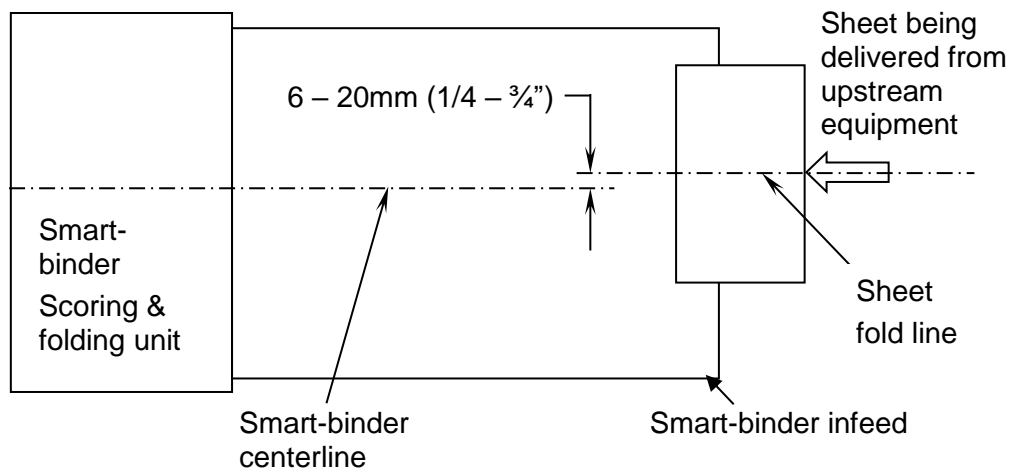
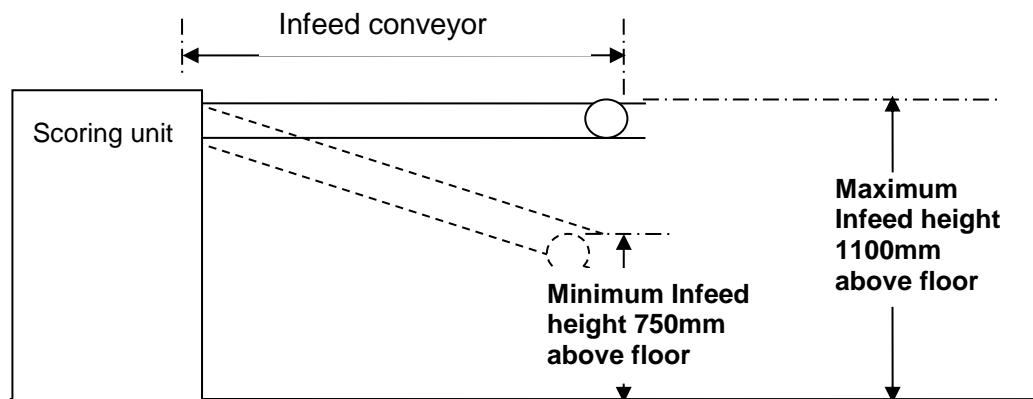
Consult IBIS for routing and dimensions of ducts.

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



11.13 **Con** :tion to upstream/downstream equipment

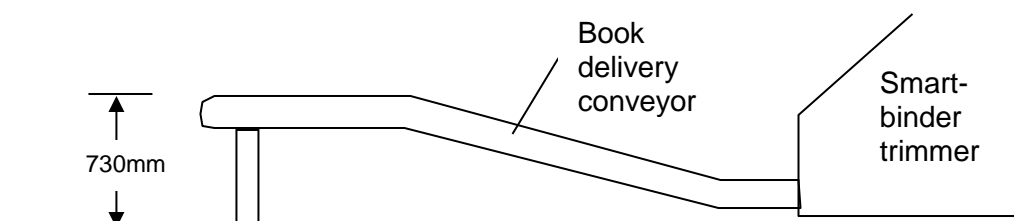
The Smart-binder infeed accepts sheets delivered from the upstream equipment (or the pile feeder in the off-line configuration) at the following heights.



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 offset from the Smart-binder centerline 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 height of the SB-1, 2 and 3 Smart-binder delivery conveyor at the take-off end is 730mm. A special delivery 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.

11.14 Installation, Commissioning and Training

Unloading

- All machines will be delivered on wooden pallets, and either covered or crated, depending on the method of shipment. 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 9.10.4 for the dimensions of the largest unit. Ensure that doors, etc. are large enough for this module.

Machine module weights and sizes (crated) (approximate)

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 feeder SB-095 for the off-line version Smart-binder is delivered in a separate crate

Crate	Size (L x W x H)		Weight	
	Cm	Inches	Kg	lb
5	141 x 96 x 135	56 x 38 x 53	355	781

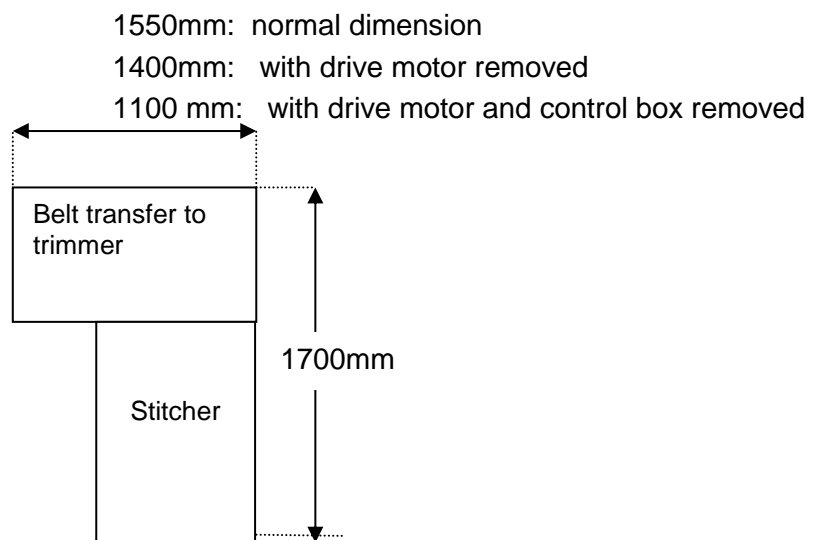
Refer to IBIS for weights and dimensions of other optional modules

Smart-binder Module Weights and Sizes: uncrated (approximate)

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 (SB4B only)	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
Chip removal conveyor (SB-042)	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

Size of largest SB 1,2,3 module (stitcher module), excluding packing.



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

The Operator Training Course

Machine operators who have 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 joggles 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.	

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 itinerary is an approximate guide only. The training subjects may be covered in a difference 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.

12 Frequently asked questions

12.1 *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 in order to make 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 be made more attractive with the use of the optional SBS-100 sheet buffer module. **Refer to section 8.2 for more detail.***

12.2 *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. **Refer to sections 8.2.4, 6.15.2 and 11.5 for more details.***

12.3 *Maximum and minimum book thicknesses*

What are the max and min 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-1200 perfect binder). The Smart-binder saddle-binder is limited to 10 mm (0.4") max 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 greatly reduced in order to avoid exceeding the maximum Smart-binder output rate. 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) and/or the Spine squaring option (SM-100) will reduce maximum book thickness.

12.4 *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 metres/min without an extra buckle folder (4-page increments) This can be increased to around 180 metres/min with extra F-100/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/F200 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.. **See performance table in section 6.30.2***

The system efficiency depends on the complexity of the system (how many different elements are in use). For the Smart-binder itself, we suggest to plan on an operating efficiency of about 85 -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 job applications, since an in-line system requires no stops for sheet feeder reloading.

12.5 Perfect-Bound books (SB-4 or SB-5)

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 automatically in the SCF. Hot-glue (EVA or PUR) is applied to the book spine and the cover is attached, resulting in very strong books. Because the signatures are pre-glued 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).

12.6 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?

*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 it is more efficient to run the printer with a normal 'wide' web and fold the resulting large sheets more than once to produce a small book format. The folder option 'RF-100' rotates and folds each sheet prior to entry into the Smart-binder infeed in order to make small format books from a normal width printer web. **Refer to section 6.12 for more information about the RF-100.***

12.7 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 be buckle-folded first using the optional in-line F-100/F-101 folder, before entering the Smart-binder infeed. The optional ASS-100 anti-static system is also recommended for lightweight sheets. Maximum speeds may have to be reduced if running paper stocks between 50 and 60 gsm without using the extra buckle folder. **Refer to section 6.18.3 for more information about using lightweight paper.***

12.8 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 ISG cold glue system) or within a range of about plus/minus 30 pages (if using wire stitching). The optional ASA-100 system allows for on-the-run stitch variation if make large changes in book thickness.

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

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

Answer: Yes..see section 6.9. The Smart-binder cover feeder can be fitted with an optional Bar code reader (or 2D code reader) to ensure that each personalised cover sheet contains the same unique book ID number as the content sheets coming from the digital printer. If there is a

cover mismatch then the Smart-binder will automatically stop and the touch screen will inform the operator of the reason why.

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 Sprint-binder perfect binder.

12.10 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

Note: For these reasons many Smart-binder users **prefer to use ISG cold glue** instead of wire-staples.

12.11 Cost of cold glue

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

Wire stitching

The cost of wire to produce 1000 wire-stitched booklets is about GBP £0.74 (GB Pounds).

This 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:

Number of sheets in booklet	Number of pages in booklet	Cost of ISG (GB Pounds)
4	16	£ 0.30
10	40	£ 0.90
30	120	£ 2.90

Note 1: If the booklets are A5 size then the cost of glue shown above is reduced by 30%

Note 2: The ISG cold glue system is easier and less expensive to maintain than the wire stapling system. This may offset the slightly higher glue cost compared with stapling when making thick booklets. Also, ISG glued booklets are stronger and lay flatter than wire stapled booklets

12.12 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: Yes the Smart-binder saddle-stitcher may be fitted with multiple cover feeders. 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 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.

12.13 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 section 6.8) the max 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.

12.14 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 7,000 sheets. The time between reloads depends on how fast the machine is running and the average number of pages in the booklets. The Smart-binder must be stopped to reload the sheet pile feeder. The reload time depends on whether the optional PLT-100 loading trolley system is used or not: allow for a few minutes to reload without the trolley system, or about 35 secs with the trolley system (providing the trolley is already loaded in advance).

12.15 Perforated sheets.

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

Answer: Yes. The optional DMP-100 Dynamic micro-perforator system 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.

See section 6.17 for more information.

12.16 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 available to be installed inside the standard SB trimmer.

See section 6.15 for further information.

12.17 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 must also be selected because loop heads require additional drive force.

See sections 6.14 for more information

12.18 Book Stacking, wrapping and/or banding.

Can the Smart-binder be fitted with an automatic book stacker, bander and/or wrapper?

Answer: Yes. A variety of stacking, wrapping and/or banding modules are available for direct connection to the Smart-binder delivery. See section 6.18 for more information

12.19 Spine squaring.

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

Answer: IBIS's optional SM-100 module can press book spines into a square shape and can be fitted directly to the Smart-binder delivery conveyor.. However this process is not recommended for books thicker than 3 – 4 mm and the maximum SM-100 throughput rate is 23 books/min. It is also not recommended to be used for ISG glued booklets (only wire-stitched booklets). See section 7.4 for more information

12.20 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 (6.3 or 9.5mm width) which results in two small format books 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 trimmer center knife is about 3- 4mm. If using the trimmer center knife when wire-stitching, then two extra stitch heads are normally required. See section 6.16 for more information

12.21 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 for 2-up production (see above), then the minimum spine length is 95mm. The stretched model SB-x must be used if spine lengths are in between 150 and 210mm.

The minimum book width is normally 120mm, but a special modification is available to reduce this dimension (refer to IBIS if needed)

12.22 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.

The stretched model Smart-binder model SB-XW is available to increase the maximum book size to 450mm (spine length) x 270mm (width).

12.23 Producing A5 booklets 2-up

Can the Smart-binder produce A5 booklets 2-up?

Answer: The standard Smart-binder can produce A5 landscape (or Digest oblong) 2-up using the optional trimmer center-knife. The Smart-binder SB-X can produce A5 portrait or Digest portrait booklets 2-up using the optional trimmer center-knife.

12.24 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.

12.25 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.

See section 11.8.1 for more information

12.26 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) 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.

12.27 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 roller table 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).

12.28 Sheet buffering when running in-line

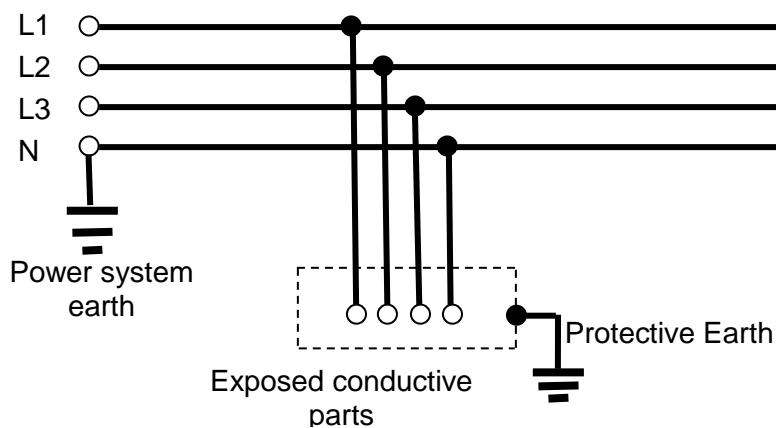
When running a Smart-binder system in-line with a digital printer, then is it possible to 'buffer' the sheets so that the Smart-binder input speed does not always have to be exactly the same as the Printer speed?

Answer: Yes, we offer the optional SBS-100 buffer for this purpose (see 6.29 for details). This SBS-100 module allows some very thin booklets to be produced 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.

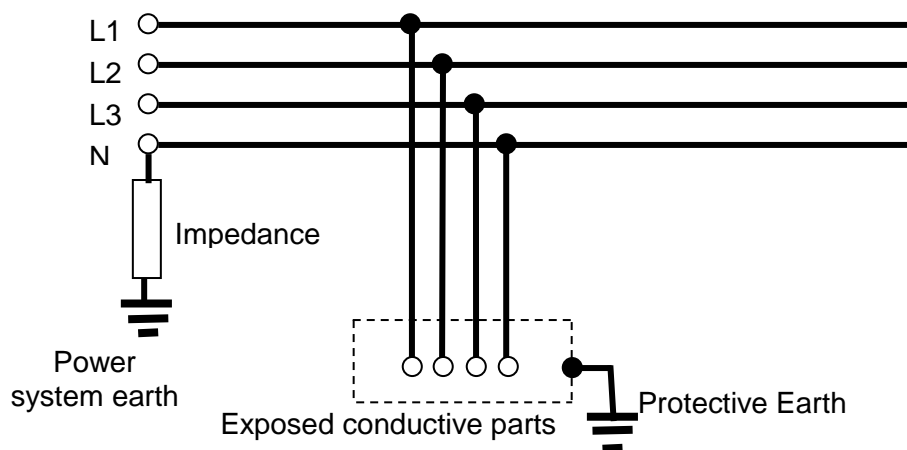
13 Appendices

13.1 Power Distribution Networks (according to UL1950 and 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.



13.2 **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 upgrades in order to 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.

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.

Duration of visits

The standard SMP pricing assumes a normal duration of 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).

SMP Price

The SMP pricing assumes an annual payment made in advance at the start of each year.

The SMP cost is higher for some years compared with others (due to the different parts needed to be fitted at different intervals), but for simplicity the price is averaged over the 4 year period commencing at the time of new machine installation.

This annual price includes all travel costs, technician's time and replacement parts (preventative maintenance) for the standard in-line Smart-binder SB-1, 2 or 3 (not including any extra optional modules. Worn or damaged parts which are not part of the normal maintenance kit (see Appendix A attached) are not included. If additional parts are needed to be fitted during the SMP visit then these must be ordered in advance.

The SMP pricing assumes a machine usage up to about 3,000 hours a year. Prices may vary slightly if usage is significantly higher than this, or if the machine includes extra optional modules. Always refer to IBIS to confirm exact SMP price at the start of each SMP year. The SMP price for machines installed outside the Europe, USA or Canada is higher because of additional travel costs and time.

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.

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).

13.3 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.

13.4 ***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 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, $\frac{5}{64}$ " tip)

Small flat bladed (about 3mm, $\frac{1}{8}$ " tip, parallel shank)

Medium flat bladed (about 5mm, $\frac{3}{16}$ " tip)

Very large flat bladed (about 12mm, $\frac{1}{2}$ " 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)

13.5 **Smart-binder (SB) Application Questionnaire for Digital Print Applications.**

This Questionnaire may be used to help determine suitability and specification of Smart-binder for a digital print finishing application.

1. Will the SB be running:

- a) In-line with a digital printer (if so what type of printer?)?
- b) In-line with a pre-printed roll unwinder (and cutter) only? or
- c) Off-line from a sheet pile feeder?

What will be sheet input rate to the SB? (State rate in sheets/min and also sheet size).

2. If running in-line with a web printer, then what is the width of the paper web (or max sheet width) to be used?

3. What type of books/booklets need to be produced by the Smart-binder? Provide as much information as possible.

4. What is the maximum, minimum and average format size of the sheets that will be fed into the SB and the required finished book sizes. How often will the machine need to be changed to a different format size?

5. Is the additional in-line cross folder with sheet rotator (model RF100) needed to help produce small book format sizes (avoids the need to use a narrower than normal web width for small formats)?

6. Is an additional in-line cross folder (model F100 or F-200) needed (i.e. to increase machine speed , or to reduce minimum paper weight)?

7. What is the range of paper stock weights to be used (max/min)?

8. What is the maximum, minimum and average number of pages in the required finished books? What is the expected maximum book thickness? Is the optional trimmer clamp system needed to reduce spine corner tearing on very thick saddle-bound books?

9. Will jobs with different page-count books be run sequentially, without system stop? If so, then what are the expected maximum, minimum and average print job run- lengths?

10. Will all sheets have a '2 of 5 Interleaved' bar-code printed on the edge so that the SB can control book page integrity? If not, then what sheet identifying marks will be used? Is the special optional laser bar code reader needed for small size bar codes? Is the optional 2-D Datamatrix code reader needed?

11. Is a separately-fed cover required for saddle-bound books? If so, will this cover be the same format size as the content-sheets? Is it necessary to supply the optional cover bar-code reader? Is more than one cover feeder needed?

13. Is it necessary to feed any insert sheets inside the book? If so, in which position?

14. What will be the range of cover or insert stock weights to be fed? Will these be digitally or offset printed? Is it likely that cover -cracking may be a problem in the folding process? Is there anything unusual about the covers (cut-out windows, gate-folds etc)?

15. Is the optional ISG cold gluing system to be supplied (i.e. model SB-3) for glued books 10mm thick?

16. Is the optional hot-melt binder to be supplied (i.e. model SB-4 or SB-5) for perfect bound books? If so, then is the single clamp PB-600 binder required, or the 4-clamp PB-2000 binder? How will the perfect binder be used?

- a) On its own for hot-melt glued 'perfect bound' books only. Hand-fed
- b) On its own for hot-melt glued 'perfect bound' books only. Fed automatically from a sheet feeder
- c) On its own for hot-melt glued 'perfect bound' books only. Fed directly from a Digital printer
- d) Directly connected to the Smart-binder SB-3 saddle-binder as part of a system that can produce all book types. Saddle-stitched, saddle glued and perfect bound books from ISG glued signatures (model SB-4).
- e) Directly connected a web-cutter stacker delivery as part of a system that can produce all book types. Saddle-stitched, saddle glued and perfect bound from loose sheets (model SB-5).

17. Is the factory temperature and humidity controlled?

18. What are the customer's productivity expectations regarding the quantity of sheets to be processed into books of a known number of pages in certain time periods?

19. Is the IBIS standard trimmer waste removal conveyor system to be used, or will the trimmer waste be removed by the customer's own extract system?

20. How many wire stitching heads are needed? Standard heads or 'loop stitch' heads?

21. Is the optional trimmer center knife needed (to produce small saddle-bound book format sizes)?

22. Is an off-line sheet feeding system (option SB-097) with bridge conveyor required to allow pre-printed sheets to be fed from a pile-feeder when not wishing to run in-line with the printer?

23. Are any other optional modules needed such as sheet perforation, sheet rotation, roller table, SBS-100 sheet buffer, hole punching, 2-D bar code reading, book stacking, stack bundling etc.

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